

Sportsman Pilot™



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Sportsman Pilot



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ALL ARTICLES AND PICTURES BY JACK COX UNLESS OTHERWISE CREDITED.

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Mag Check

As we begin our second year of publishing **Sportsman Pilot**, general aviation — at least the commercial side of it — is experiencing a continuation of hard times. Plants are closed, sales of singles and light twins are spinning straight in and foreign manufacturers are circling ever closer, waiting to pick the bones. Only sport aviation has been weathering the blow . . . which proves for about the millionth time that people will give up anything but their hobbies.

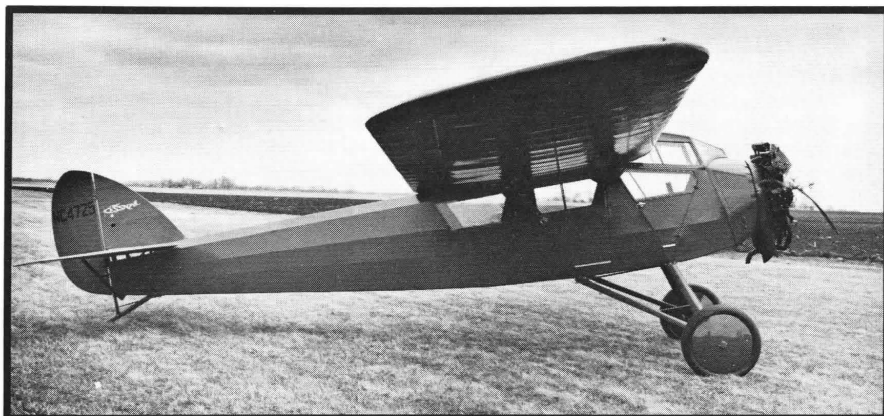
Much of this issue is devoted to the Sun 'N Fun Fly-In in Florida in mid-March. "What recession?" was an inevitable impression as you looked out over the acres of aircraft, people, cars and campers from all over the world. Statistics I've since been provided by fly-in management confirm my eyeball estimation that Sun 'N Fun was bigger than ever. It certainly was fun . . . and gloriously warm.

The talk of the town . . . and, soon, all of aviation . . . was the ultralight participation. There were about 400 registered during the week — four times last year's body count. Even more of a sensation, however, was the number of totally new designs — a dozen — and the degree to which they were moving away from the powered hang glider concept to simply very light airplanes. To those of us who have been in aviation for a long time, this is a welcomed trend. All of us, I'm sure, have looked on the low and slow kind of flying offered by ultralights as the closest thing yet to our primal dreams of unassisted flight . . . or, at least, just plain fun. But, like me, you may also have been casting a jaundiced eye at some of the construction materials and techniques, the control systems (or lack of) and the rather cavalier attitude toward engine reliability, airframe damage . . . not to mention that of our own soft, pink bods. Fortunately, the trend seems to be away from such foolishness.

Ultralights are not a flash in the pan. They are and will continue to be a part of aviation . . . and "general aviation" as we have known it will be altered dramatically. Big money is about to jump in with both feet and the FAA . . . well, it will probably do SOMETHING one of these days. You'll be surprised how **little** it will be, though.

You'll also find a retrospect piece in this issue on the de Havilland Comet racer, one of my all-time favorite airplanes. The research, frankly, was a form of therapy for me . . . a way to endure the incredibly bitter Wisconsin winter just past. I hope it does you as much good as it did me.

KALEIDOSCOPE



PHOENIX DIPLOMA

Once again, congratulations are in order for Gar Williams. The very first cover of the very first issue of **Sportsman Pilot** featured a photo of Gar pulling the prop through on his then just restored 1928 Cessna AW. Inside was the first article written on the airplane. Later in the year, the AW would be named Grand Champion Antique at Oshkosh and, a few weeks later, Grand Champion at Blakesburg. Now, word has been received that the AW has been awarded the Phoenix Diploma. This is an international award presented by the Federation Aeronautique Internationale (FAI) for the world's best antique restoration for a given year. Grand Champion of Planet Earth, you might say!

The AW is already retired to the EAA Museum, but with the Phoenix Diploma in the bag, the only thing left, Gar, is to have it bronzed!

Gar, incidentally, has made his hobby his vocation. He has started his own business, Rags To Rivets, and is ready to do your restorations, maintenance and annuals. He'll tackle anything, he says, so will the fellow with the Curtiss Condor basket case please contact Gar at 9 South 135 Aero Drive, Naperville, IL 60540. Phone 312/355-9416.

GLASAIR NEWS

If all goes as planned, Oshkosh '82 will see the introduction of a new version of the Glasair — a tricycle, retractable geared 160 hp version with a constant speed prop. Top speed is calculated to go to 245 mph. The gear will be available as a separate package, retrofitable into existing Glasair tail draggers — complete (even painted) and ready to bolt in once the airframe has been made ready for it.

To safely accommodate the extra speed, flutter testing has been done to find what is needed to up the do-not-exceed limit. Counterweights may be added to the tips of the elevators. The tests were accomplished by FAA DERs (of which there is no lack in the Seattle

area).

Expect to see a Glasair show stopper at Oshkosh this summer. Remember Norm Ross, the builder of Pegasus, the fabulous VariEze that was homebuilt Grand Champion at Oshkosh in 1979? He's building one — and he's already been offered twelve grand for the engine! It was started in September of 1981 and should have flown by now . . . he's a doer! Norm must have some interesting trips planned . . . he's going to have a fuel capacity of 104 gallons.

Tom Hamilton plans to move the Glasair operation to the Arlington, WA airport in May — into a 30,000 sq. ft. facility. Kit production of the extremely popular design is currently at 20 per month. Orders are backlogged 10 months. Tom hopes to expand production to 30 kits a month in August.

245 mph!

R/C WORLD

Planned communities are almost as plentiful as orange groves in Florida, but a new one going up just east of Orlando may have far-reaching effects on aviation. Called R/C World, it is a 177 acre site intended to be a retirement paradise for radio control modelers. 100 acres will be used as a flying field for R/C models of all types and will include a man-made lake for model boats and float planes. Sophisticated equipment will monitor frequencies and screen out interference from the housing area that occupies the remaining 77 acres. Both condos and homesites were available in the beginning of the project — but have long since been sold out. To finance R/C World, the developers are selling stock to modelers rather than going to the banks. If you're interested, contact: R/C World of Florida, Inc., 216 E. Jackson St., Orlando, FL 32801.

What's interesting about R/C World for us "real" airplane types is that it came about as a way to overcome the hassles by those elements in society who seem to hate anything with an engine and, particularly, anything that flies. All the necessary zoning and use per-

mits have been obtained, so anyone who complains about R/C World will be advised to move elsewhere. We, of course, are faced with the same problems — noise complaints, closing airports, etc. — and have seen the establishment of airport/residential projects as an answer. The intriguing thing about R/C World is that its flying site, with 400 foot paved runways and lots of open space, would be perfect for ultralights.

Anyone for Ultralight World?

DIRIGIBLES, ANYONE?

The city of Youngstown, Ohio has sold 110 acres of public land to Wren Skyships Ltd. for one British pound (about \$1.80) on which to build a factory . . . to build dirigibles! The British company joins another firm that will build a commuter plane in Youngstown, which is trying to provide jobs to replace those lost in the demise of its steel mills.

NEW EINDECKER

In our last issue, we featured an article on Doug Champlin's Fighter Museum in Mesa, Arizona. We mentioned that Doug intends to add fighters from time to time so that you'll want to visit every time you are in the area. Well, true to his word, Doug has just added a Fokker Eindecker, fresh out of the shop of Jim and Zona Appleby. Jim flew the aircraft before it was shipped east . . . so it is a "real" airplane instead of simply a static display.

POLLIWAGEN NEWS

We kept looking for the Polliwagen at Sun 'N Fun, but it didn't show. A little concerned, we were later relieved to learn that although a problem had occurred on the flight from California to Florida, there were no injuries and only minimal aircraft damage. In subsequent conversations with Joe Alvarez and his pilot Dave Moss, we've learned the following: The company's Polliwagen had been fitted with a one-off, strictly experimental 3-blade metal propeller . . . and over west Texas it threw a blade. Fortunately, Dave had just spotted a runway 3 or 4 miles away and although he was only about 2500 feet AGL, he was able to glide in for a landing. Probably because the prop was a 3-blader, the loss of one blade, while setting up a terrific, low frequency vibration, was not bad enough to rip the engine off the airplane, as often happens. In fact, close inspection revealed only superficial damage to the airframe — the battery box had been torn off the firewall, the exhaust pipes had banged up the cowling a bit, etc. The engine mount, mount attach points and the forward fuselage were O.K.

By pure luck, Dave had landed on the ranch of John Maguire, a pilot/warbird enthusiast/rancher who has a full time mechanic employed to maintain his sizeable collection of airplanes. Dave says Mr. Maguire couldn't have been nicer or more helpful in his hour of need. Joe and some Revmaster personnel were on

the scene the next day with a new prop, and, shortly, Dave was in the air, flying the Polliwagen back to LA.

By virtue of a cool, skillful pilot, a good glide ratio and a bit of luck, all ended well . . . but no more experimental props, please, Joe!

The Polliwagen will be on the air show circuit this summer, including Oshkosh, so watch for it.

SUPER STARDUSTER ONE

From friend Ray Gordon we learn that a new unlimited aerobatic airplane is nearing completion in the Stolp Starduster shop on famed FlaBob airport at Rubidoux, CA. Bill Clouse, the new honcho at SS, has gone back to the tube and fabric construction of the original Starduster (the Acrodusters of more recent vintage have metal fuselages). It will be powered with a 200 hp Lycoming and a CS prop, will have a spring gear and will utilize the nearly symmetrical Osborne SA700 airfoil. The four ailerons, rudder and elevator will be servo-assisted and, interestingly, none other than Vernon Payne of Knight Twister fame is designing a system in which at full forward or aft stick, the ailerons will move up or down to augment pitch.

The Super Starduster is being built for Tom Green and his son, Richard, who entered aerobatic competition last season.

And while we are on Starduster Ones, the very first one, Serial No. 1, still exists. It is owned by Al Kelch of Mequon, WI, but is in his shop at his winter home in Frostproof, FL. Al lives on an airstrip there and his hangar also contains the Serial No. 1 Corben Baby Ace. Both aircraft are under restoration, but on a low priority, fun basis.

VOYAGER A'BUILDING

At Sun 'N Fun Dick Rutan told us his non-stop round-the-world project has been financed and that construction on the aircraft, the Voyager, is underway. He hopes to be nearing first flight by the end of this year. The project is going forward despite the fact that other contenders are already flying — Jerry Mullen's Phoenix (nee BD-2) and Quickie Aircraft's Free Enterprise (nee Big Bird). Dick says the Voyager will be capable of much longer flights than either of these two, so regardless of flights they might make in the interim, Voyager will be out to beat their marks.

Dick and Jeana Yeager still intend to capture the C-1b altitude record in their Long-EZ and go after some more speed marks.

THINK ELOY

In our last issue we took you to the Copperstate Fly-In at Marana, AZ and to the HAPI engine works at Eloy, AZ. Well, now we have learned that the fly-in is to be moved to the Eloy airport this year. Rex Taylor and the city fathers went all out to get the event — with such enticements as an old fashioned

western barbecue right on the site, lots of room, no skydivers during the fly-in, etc. They've already had a gyroplane meet there and are working on getting the Arizona antique fly-in held in Casa Grande in past years . . . in mid-winter.

Sounds like Eloy is going to become a big name in the sport aviation world.

RETURN OF THE HOMEBUILT UNLIMITED RACER

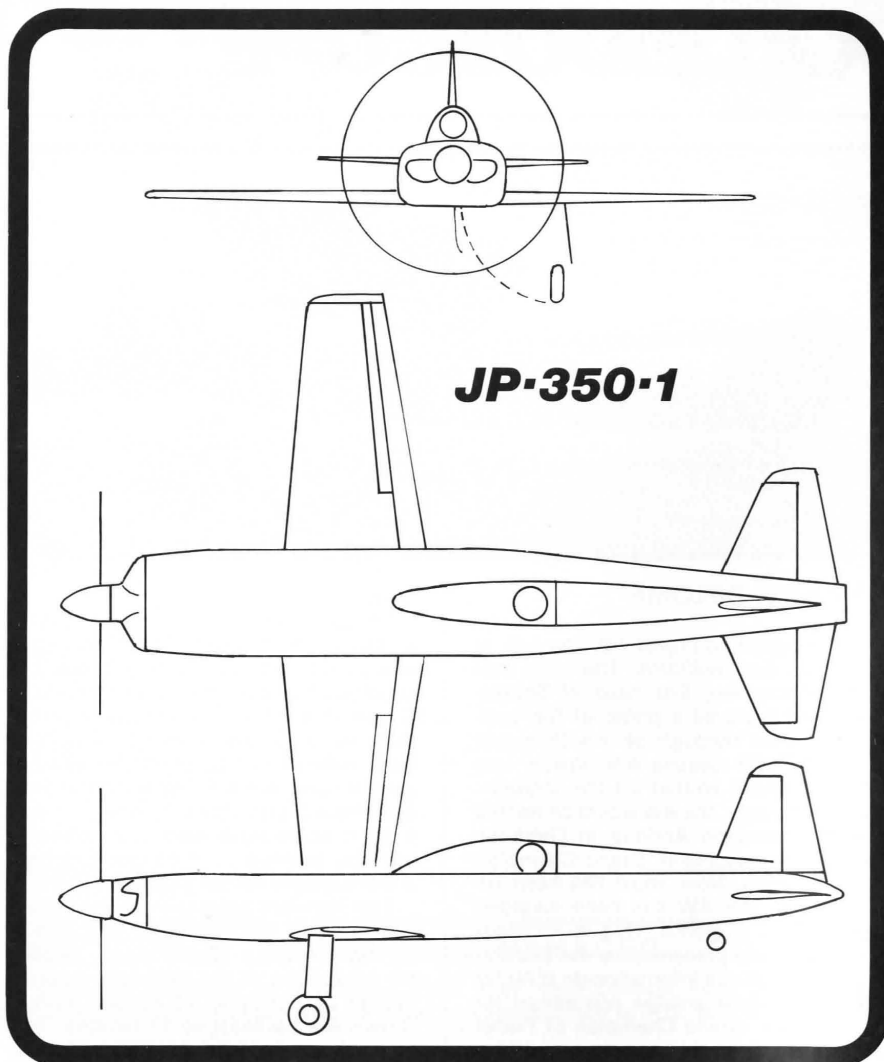
It's been talked about since the end of World War II, but, finally, it appears homebuilt unlimited race planes are going to make a comeback. Not since the 1939 Thompson have we seen the likes of Steve Wittman's Bonzo, the Gee Bees, Lairds, Wedell Williams, etc. Surplus P-51s and Bearcats have dominated the unlimited scene since the war — but they may soon have some competition. John Sandberg has a crew of Lockheed employees rushing to competition. John Sandberg has a crew of Lockheed employees rushing to complete a racer he calls "Tsunami" for Reno this September . . . and John Parker of Formula One fame has started construction of a homebuilt he calls the JP-350-1 (see drawing). It's powered by a Lycoming TIGO-541, highly modified for racing — water injection, nitrous oxide boost, etc.

Then there's Bill Statler and Charlie Beck's R-2800 powered racer which you may recall from a **Sport Aviation** article in 1981. It will be at Mojave for final assembly and eventual flight test as you read this. And, finally, there's Dave Garber's DG-1, the Mazda powered push-puller that has flown, but is still being debugged.

Homebuilt unlimiteds capable of blowing off the Mustangs are technically feasible . . . all it takes is money. Whether they will be able to overcome the "protect my investment" politics from current warbird racer owners is, unfortunately, another matter. It happens in all forms of racing.

MOLT TAYLOR SEZ . . .

Molt Taylor tells us he is about to spring a new goodie on the sport aviation world that will be the answer to the prayers of builders of little airplanes like the Quickie, MONI and his own Micro-Imp. It's a variable pitch prop that weighs only 8 pounds, total, and even has Beta (reverse pitch) capability. Pitch change actuation is purely mechanical — no electric or hydraulic systems are involved. He expects to be flying it on the Micro-Imp at Oshkosh this summer . . . and, no doubt, will get a lot of attention



when he backs it into its parking spot after returning from a flight!

A year ago, in the very first edition of **Sportsman Pilot**, we introduced Molt's new design, the Bullet 2100. A side-by-side 2-place tail pusher, it is unique in that the engine (a 2100 Revmaster) is mounted in the nose and drives a prop shaft that extends between the seats and back to the tail. (Weight and balance and engine cooling are the obvious advantages of this configuration.) Well, the prototype is now underway and is being worked on by Molt and his associate, Jerry Holcomb, on a high priority basis.

FREE ENTERPRISE

Tom Jewett's (Quickie Aircraft) round-the-world contender, Big Bird, has had its name changed to Free Enterprise and

is well into its test flight program at this writing. Tom tells us the aircraft handles surprisingly well. Due to its highly specialized nature, he expected it to be something of a truck, but it is a pleasant and relatively agile airplane, he has found. Electronic equipment installation and fuel system debugging was still going on in mid-April and the "go" date for a record flight had not been set. Stay tuned.

Tom has also informed us that 8 customer built Q2s were flying as of mid-April, with quite a few more getting close. We should see several at Oshkosh this summer.

DID YOU KNOW?

● That as of mid-April both the Cessna 152 and 172 were out of production? High interest rates and too many un-

sold airplanes at dealerships around the country are said to be the reason. Production will resume whenever the economy improves and sales pick up, Cessna says.

● That for the first time in memory, the value of general aviation aircraft being shipped into the U.S. has **exceeded** the value of those our industry has shipped out to the rest of the world? It happened in 1981 . . . and is looking just as bad so far into 1982. First transistor radios, then TVs, autos and now America's invention, the airplane? Say it ain't so!

ON THE COVER

The brave new world of ultralights is adding a lot of new names these days . . . like Bobby Baker and his Mohawk. Seen in close-up on our cover, you can read about it elsewhere in this issue.

LITTLE BUTCH TO NASM

"Little Butch", the legendary Clipwing Monocoupe in which Woody Edmundson won the World Aerobatic Championship in Miami in 1948, has been donated to the National Air and Space Museum. John McCulloch, owner for about the last 20 years, made the bequest recently — with a lump in his throat. He knows ol' 36Y is now where it belongs, but he will miss it terribly.



SUN 'N FUN ALBUM



Flight Design's new 440ST. The "shark's fin" on top is a ballistically deployed parachute — inside a streamlined fairing.



This was a typical view of the Dragonfly . . . until Bob Walters finally talked himself right out of a voice! You're going to see a bunch of these things soon. A bunch!



A KR-2 with forward sliding canopy. Owned by Brian Benjamin of Spartanburg, SC.





Roy Redman's Grand Champion Stinson SR-8C framed by the cockpit of an Aeronca C-3. This magnificent Gullwing was flown to Florida from its home base in Kilkenny, MN with just two stops along the way. That's travelin' in style!



John Monnett at Sun 'N Fun with his MONI. Since returning home to Oshkosh, he has installed the clamshell airbrakes on the landing gear. Really helps control glide path, he says.



A Rally 2B, a 3-axis ultralight now flying in almost every country in the world.



... AND, NOW, ABOUT THOSE **ULTRALIGHTS**



American Aerolight's canard Falcon. Still under development but should be available this summer.

Yes, all the accounts you've heard are true . . . the ultralights descended on Sun 'N Fun '82 like a biblical plague of locusts. They outnumbered all the other showplane categories **combined** and literally blackened the sky when they flew. Most of the new designs, new engines and new innovations seen at Lakeland were solidly within the ultralight camp. In short, their domination of the event could hardly have been more complete.

One brash young boulder capped the stack by joking that next year the ultralights would be occupying the front and center area now reserved for homebuilts. Well, out of the mouths of babes, as they say . . . there could be an element of truth in his prediction, but likely not exactly what he had in mind.

Given the ultralights at Lakeland with N numbers on them . . . in concert with all those that **SHOULD** have had them, it was obvious, indeed, that a large percentage of them **will** soon be parked with the homebuilts . . . because that's what they really are.

From the very beginning of the modern hang gliding era, when people like Barry Palmer and Richard Miller were fluttering down sand dunes in California in the 1960s, I knew it was simply a matter of time before someone would hang a little engine on one of the flimsy contraptions . . . and when John Moody finally did it, I knew it was inevitable that his Icarus II and its offspring would rapidly evolve into little airplanes. Now they have . . . and Sun 'N Fun '82 was where that message came through loud and clear.

Now, I don't claim any special powers of perception and, certainly, I was not alone in my predictions. It has simply been a matter of history repeating itself . . . and those of us who have been around for a while being among the first to recognize familiar old patterns.

If you learned to fly back in the 65 horsepower trainer era (or earlier) as I did, you know the routine. One day your instructor climbs out of the front seat of the Cub, fastens the seat belts so they won't fall down into the rudder pedals . . . and changes your life forever by telling you to have at it . . . alone. You solo — and you're free at last! Free to roam the heavens at will, to explore those awesome, endless canyons of cloud and, after a late summer shower, to go up and chase its rainbow.

At least that's the way we imagined it would be . . . and for the first few hours our dreams **do** materialize to a degree. Soon, however, human nature begins to rear its ugly, disillusioning head. Just going aloft all too quickly ceases to be a source of amazement . . . the landscape we saw through the gaze of an eagle becomes commonplace . . . and our beautiful, marvelous little yellow airplane begins to have its faults. In time, we begin to realize it is painfully slow; we begin to notice that on windy days others are still flying in their larger, more powerful airplanes after we've been forced to call it quits; and the significance . . . and the limitations . . . of things like short range, low wing loading, sluggish rate of climb, etc., begin to sink in.

We aren't as free as we dreamed we would be.

Oh, we still dream — but now our horizons are widened. We picture ourselves spanning continents . . . and we begin to long for airplanes with performance to match our brave new visions. And our pocketbooks. Traditionally, this has been the crucial crossroads in the flying careers of most pilots. A determined few go on, climbing the ladder of even more licenses and ratings, of ever more powerful and capable aircraft . . . as far as their checkbooks and/or ingenuity can take them. Many face the realization that they simply can't afford

to progress further and, not content to simply bore holes in the sky for the rest of their lives, drop out of flying entirely. And there are those who start out with a specific goal in mind, a certain level of participation they want to achieve and, once there, are content to stay there. A lot of purely recreational pilots fit the latter mold.

Aviation has always been this way. It's the pattern Jenny pilots fell into during the 20s, it was the same for the Aeronca C-3 and Taylor E-2 pilots of the early 30s, the Cub pilots of the 40s and 50s, the Colt and 150 pilots of the 60s and the 152 and Tomahawk pilots of more recent vintage.

And because they're human, because they hitch up their pants in the morning and put cream and sugar on their Wheaties the same as every generation of pilots before them, ultralight drivers are marching right down the same ol' pathway.

More power, more performance, greater range, two-seats, 3-axis controls, instrumentation, disc brakes, electric starters, fixed seats, shoulder harnesses, windshields, cockpit enclosures, wheel pants, watercooled engines (can cabin heaters be far behind?), radios . . . even strobe lights! These were the accouterments this year's new crop of ultralights were sporting at Lakeland.

The more things change, the more they stay the same!

Hawk, Invader Mk. III, Mohawk, Ptiger, UltraStar, Swallow, Phantom, Falcon, Big Lifter, Double Quick, 440ST and B1-RD are a few of the new names you'll have to add to your ultralight repertoire.

Ultralights **are** unique in a few instances. Although in the same **relative** position that Cubs and Champs, C-3s and E-2s once held in relation to the rest of aviation — the bottom of the performance scale — they **are** an order of magnitude lower in empty weight, wing loading and stall speed than anything

we've ever put into the sky in comparable numbers. Most of them — at least the first generation types — are severely limited in the wind velocities in which they can be safely operated, many can be folded up, zippered into a carrying bag and cartopped home . . . to be stored in the garage . . . and, yes, there appears to be sufficient evidence to conclude that they **can** be mastered by non-pilots in very short periods of time, often with no instruction at all.

There is even historical precedent for ultralights being the right product at the right time — as they are in these economically depressed times. Just as the C-2, C-3, E-2, Curtiss Junior, et al, came to the rescue of personal flying in the early 30s, when The Great Depression had it on the ropes, the ultralight is promising to be the White Knight of personal flying's here and now. At Lakeland, manufacturers were shocked (and mightily pleased) to find themselves selling aircraft and negotiating deals for dealer and distributorships with FBOs. Not just mom and pop, small town FBOs, mind you — we're talking big time, Citation set, you-can't-afford-it-if-you-have-to-ask-the-price-type FBOs. Many of them are hurting so badly, they want to buy kits for their mechanics to assemble so they can justify keeping them on the payroll, after which they plan to rent out the ultralights to customers who can no longer afford the rates for 152s and Tomahawks. To keep their key instructors on, most will require an hour or two in "real airplane" trainers before turning pilots loose in ultralights — and thereby keep their training fleet intact. Considering who some of the FBOs are, it's a rather chilling indication of just how desperate the situation has become in general aviation.

As always, of course, there are a few pragmatic types who, rather than acting out of desperation, have simply recognized ultralights as a permanent fixture

in aviation and are moving in to get their share of the bucks they figure can be made on them.

Hanging over all this feverish money grubbing, however, is FAA's Sword of Damocles. How will they rule on their ultralight NPRM? What connection, if any, is there between the NPRM and the new petition for recreational pilot licenses? The existing companies with their production tooling in place and their bank loans to repay are the ones who are really sweating. If ultralights make a sharp turn to the left or right as a result of future FAA rulings, they could be ruined, some fear. It was for this very reason that almost all the designers of the new birds I talked with stated they were hedging their bets by designing to the proposed 220 pounds empty weight, yet keeping open the option of making it a homebuilt. With this flexibility, plus the fact that they are aiming at the most viable segment of the market anyway — all us licensed pilots — they would appear to be settling comfortably into the driver's seat for leadership of the ultralight world of tomorrow. (And let us not forget, of course, those designers and manufacturers who have had the right idea all along.)

Other than the new aircraft, themselves, the most significant thing I observed at Sun 'N Fun '82 was a little sequence of events that neatly sums up all I've been trying to relate to you here. Compared to last year, the winds were mercifully calm all day, every day in '82. One morning early in the week, however, they did freshen a bit — and the awful truth was unequivocally and dramatically revealed. The ultralight aerodrome at Lakeland is a large triangle of paved taxiways, allowing six options for operating into the wind. Depending on which runway is in use, there can be some rather lengthy taxiing to the active, but this isn't all bad because it permits a bunch of ultralights to queue up for

rapid-fire take-offs. The disadvantage, of course, is if the wind is up, there are going to be some exciting moments as pilots try to taxi down the two crosswind legs to get to the one that's into the wind. You know what happened, don't you? The new (and a few old) 3-axis jobs were motoring merrily around the track with an aileron or spoiler thrown into the wind like a "real" airplane . . . while the poor little weight shifters were tipping up, running off into the weeds or just shutting down and hanging on for dear life! At one point there were so many wings pointed skyward it looked like a flotilla of sailboats on a grassy sea!

In short order, the ultralights that couldn't hack the wind were back at their tiedowns — while the 3-axis jobs were still out having a grand time of it. It was an object lesson not lost on anyone who witnessed it.

Now, none of this should be interpreted as predicting the demise of the simple, first generation ultralight. There are those in the industry who seem to think (hope?) an unbridgeable gap exists between ultralights and the next level of aviation, the simpler homebuilts, **and that this will be a permanent arrangement.** What I and a lot of others have been predicting is that this gap would quickly fill with **many** new designs, representing **many** levels of technical sophistication.

THAT is what is happening today.

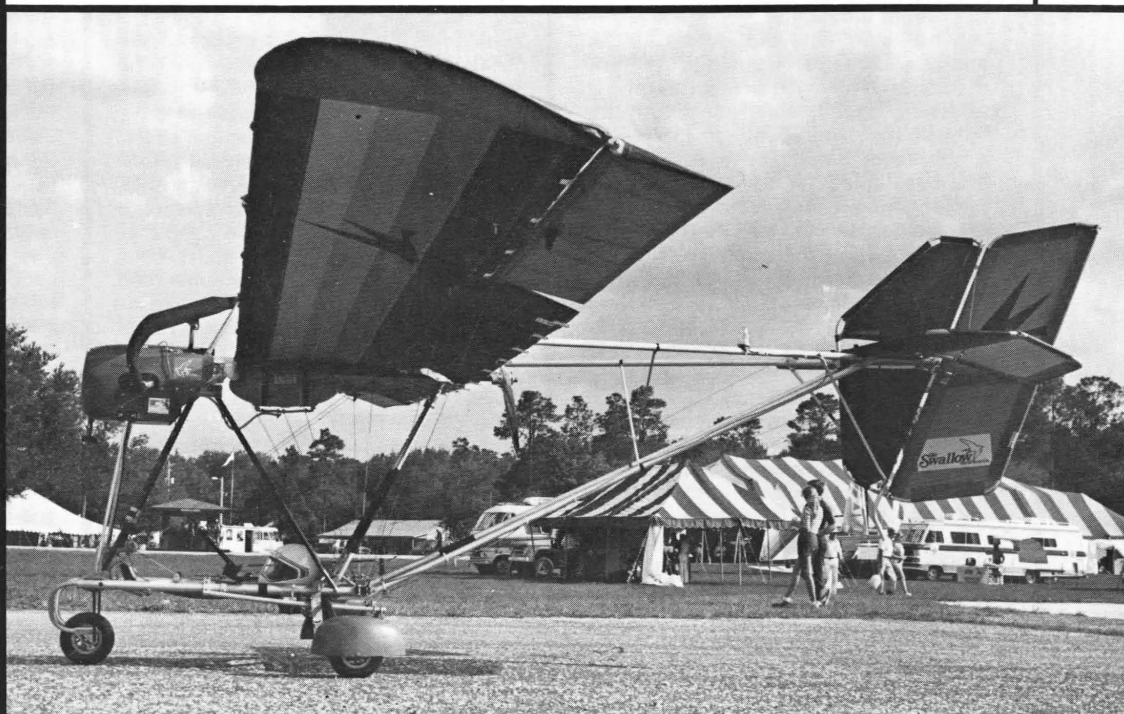
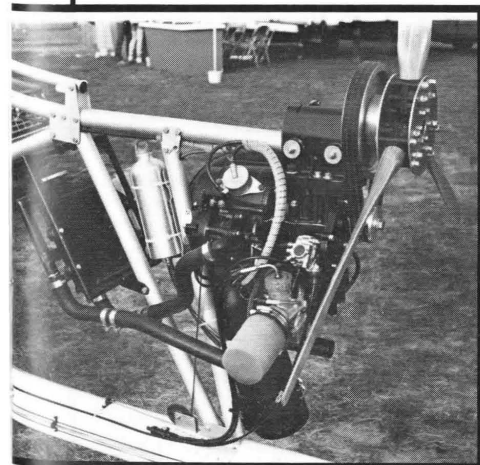
Hopefully, the simple, first generation ultralight **will** remain as the entry level into aviation for the greatest possible number of people. The only thing I see preventing this is price — many of them are more expensive than the new "airplane" types. Market forces will take care of this, I expect.

Whatever the future holds, it's going to be exciting!



New water cooled Spitfire 220 mounted on a Hummer.

The new Swallow. Still another ultralight of obvious Humbug parentage, but about as close to a lightplane as you can get without covering it with yellow fabric and putting a black lightning stroke down the side of the fuselage. Very popular with licensed pilots.



Bobby Baker's MOHAWK



One of the good things coming out of the ultralight mania is the emergence of a new crop of airframe designers. Interestingly, a number of them are coming from modeling, seeing, I suppose, that ultralights aren't that far removed from the big models they have been designing.

Take Bobby Baker of Piggott, Arkansas as a case in point.

Bobby, 37, is an aeronautical engineering graduate of the University of Arkansas, Class of '67. He had offers from outfits like McDonnell, but turned them down to go into the residential construction business. He wasn't interested in designing **parts** for some aerospace biggie — he wanted to design **airplanes**. He had been heavily into RC models since he was 12 or so . . . so, he would be content to build houses for a living and continue to design and build model airplanes for the fun and love of it. Over the years he designed nearly 150 RC models and had plans for a number of them published.

Then in 1980 he went to Oshkosh and discovered ultralights.

"This is it!", he thought to himself and as soon as he returned to his home in northeastern Arkansas, he began sketching and thinking about an ultralight of his own. Right off, there were a couple of design criteria, one plus and one minus, he could plug into his thinking to use as a starting point for his design. He did not like the idea of hanging out in the open while flying, so a cabin enclosure of some sort would have to figure in. And, as a close observer of the homebuilt movement, he had decided he wanted to do something with composites.

A number of configurations were considered before Bobby finally settled on a somewhat unusual twin engined, twin boom, four point landing gear arrangement. Perhaps the most unusual features were the "upside down" fins and rudders. The Boeing YL-15 Scout was somewhat similar in layout, but far from being an ultralight.

Construction is of the foam and fiberglass "composite" method so much in vogue these days, even down to the wing struts. The 30 foot wing has a spar built up out of spruce, foam and glass, to which are glued solid foam ribs. A half inch thick foam skin covers this structure, with 4 ounce fiberglass and RAF epoxy laid up over that. With the thick, high lift airfoil used, a solid core would have been too heavy, Bobby says.

The tail booms are simply long, narrow boxes, glued up out of one inch thick boards of blue Styrofoam (used throughout the structure) and covered with unidirectional glass. The tail surfaces are solid foam and glass — with inboard struts for the vertical fins that double as tail wheel mounting struts. Both of them. The fuselage pod is pretty much a fiberglass shell with reinforcing ridges molded in where needed to distribute the flying and landing loads. The wing struts are solid foam cores covered with unidirectional glass, and the main gear legs are unidirectional roving and epoxy — so strong it would take a bulldozer to break them, Bobby believes.

The big bubble windshield and the panels in the two doors are Lexan. The removable doors hinge at the top and swing out and upward for ease of entry and exit to the plushly upholstered cabin. That's right, folks, a **plush** ultralight cabin! There's a side controller stick and a rudder bar to actuate the standard 3-axis control surfaces, and a couple of pull cords to allow engine starts from the cabin. The two throttles are mounted on the left side of the pilot and can be jockeyed independently to maneuver in tight places on the ramp . . . just like the big boys.

With all the emphasis on more and more power these days, ultralight enthusiasts at Sun 'N Fun were rather surprised to find the Mohawk powered by two tiny 12 horsepower MAC 101 engines (turning a couple of very long props through belt reduction units). This raised some eyebrows because MACs are, by ultralight standards, something

out of the dark ages (anything more than 2 years old is **ancient** to ultralighters!). The "flightline engineers" gave Bobby the business all week over his tiny engines, turning deaf ears to his attempts to explain that with a combined static thrust of nearly 300 pounds, the MACs were perfectly adequate — in fact would climb the Mohawk on just one (providing climb speed is reached before one quits, of course). The doubters, accustomed to the high drag of the more common wire braced, flying lawn chair types, apparently couldn't quite come to terms with the lesser power requirements of the more streamlined Mohawk. They'll learn.

The Mohawk's fuel is carried in two 2½ gallon tanks built into the wings just inboard of the engine nacelles. The two wing panels and struts are held on with 6 bolts each and quickly detach for trailering. 20 minutes for 2 people is the required set-up (or take-down) time, according to Bobby.

The Mohawk was designed with the 220 pound empty weight limit in mind — the magic number everyone thinks FAA will ultimately adopt as the upper limit for ultralights. The prototype came out at 230, but can easily make 220 if the Feds do settle on that number, Bobby says. Because of the uncertainty involved, he licensed the little twin as a homebuilt so that he would be covered no matter what Washington decides . . . or when.

N1381T was initially flown last September and had about 14 hours logged by Sun 'N Fun time. FAA had assigned a 40 hour test period, so not having completed that (the winter was rough in Arkansas, too), the Mohawk could not be flown at Lakeland. It gets off, Bobby says, from its rather flat, four point stance without much of the usual acceleration/tail up/rotate transition necessary in something like, say, a Cessna 140. It normally just sort of levitates from the four point attitude, although you can raise the tailwheels, if you prefer, before pulling it off. In flight, the MACs will

haul the Mohawk out to a top of about 80 miles per hour and cruise it at 50. Attempts to stall the airplane simply result in a full aft stick mush during which all three control axes are still effective. Bobby has seen an indicated 15 mph in the mush, but normally lands at 20 to 25 to have a little better margin of control to work with in case of gusts. Landings are easy, he says, either tail wheels

first, 4-point or wheel landings.

Bobby is still a low time pilot — a Student with about 14 hours in a Cessna 150 and roughly the same amount of time in the Mohawk. He finds his airplane to be very easy to fly, but believes everyone should get a little "real" airplane time and learn the rules of the road before flying his or any other aircraft.

The Mohawk is perhaps the most sophisticated airframe to be spawned by the ultralight craze. It is really a very light airplane and undoubtedly will appeal more to licensed pilots than the tube and wire types. If you want more information on it (before Oshkosh), write: Warpath Aviation Corp., Box 225, Piggott, AR 72454. ☐



Looking at the Invader Mk. II and III for the first time, I had the feeling that, "Well, somebody finally did it — made a model airplane so large it can carry a man aloft!" And in a round about way someone did. Designer/builders Rick Berstling and Nick Liechty of Sarasota, FL have been building RC models for about 10 years, and when they set out to build themselves a couple of ultralights, they leaned heavily on their knowledge and experience gained through models. Now, this isn't bad — in fact, it's very good. It led them to solve their basic design problems with aerodynamics rather than the usual expedient of more power. By designing a clean, full cantilever wing and a streamlined fuselage pod, they have been able to achieve most of their performance goals on just 14 horsepower (from a 215 Yamaha golf cart engine).

Actually, the Invaders are the duo's second and third homebuilts. 8 years ago they built a high wing job powered by a 175 Yamaha, in which they taught themselves to fly in hops down the runway in ground effect. Rick went as far as to get a little Cessna 150 time, but quickly realized it was going to be too expensive to rent on a regular basis . . . to get to fly as much as an enthusiastic young pilot wants to. Ultimately, this frustration led to the Invaders.

The two wanted something that would be inexpensive and easy to fly. The lat-

ter desire was translated into their design as an Ercoupe type 2-control system, operated off a stick. Left/right movement actuates the interconnected rudder and aileron for coordinated turns, and fore/aft movement operates the elevator for pitch control. On the Mk. III, the tri-gear version, a rudder bar steers the nose gear . . . unfortunately, backwards like a bob sled. Only experienced pilots, Rick says, have trouble with this . . . but considering the fact that there are about 650,000 licensed pilots in the U.S. who don't own an airplane and who might want to own an otherwise extremely well thought out little airplane like the Invader, it would obviously be a smart move to rig up a simple linkage to make nose wheel steering go the "right" way.

Construction of the Invader is a clever mix of aluminum tubing, wood, foam and glass. The fuselage pod is a tubular frame of arc welded 6061 T6 . . . including the engine mount. It is covered with 1.7 oz. Dacron and finished with automotive polyurethane paint. The tail boom is a 4 inch diameter 6061 T6 aluminum tube and the V-tail panels consist of an aluminum tube spar, foam ribs and heat shrunk Mylar covering.

The wing is quite a neat bit of work. It's a three piece affair, with a center section and two outer panels that can be removed and stowed for ground transport much like modern gliders. Construction consists of a conventional box spar

with tapered spruce booms and a shear web that has a foam core sheathed with 1/16" plywood. Ribs are solid foam with spruce caps. Aft of the spar they are built in diagonally, or in "Vs", like an Ercoupe or Molt Taylor's Coot and IMP series . . . to carry the drag loads. The Invader Mk. III has clear, 2 mil Mylar covering on the wing panels (and the ruddervators), so you can see all the structure. Heat shrunk, it appears as taut as doped fabric.

Now, what do you think it weighs? Remember, it has a full cantilever wing — with a span of 31 feet. Would you believe 165 pounds! That's quite an accomplishment, isn't it? Length is 17 feet. The wing area is 140 square feet. Max speed is 55 mph (on 14 hp, remember), the rate of climb is 400 fpm (ditto) and it stalls at 20 mph. Take-off roll is 150 feet. The L over D is 14 to 1, according to the Invader data sheet.

I asked what the future held for the design and was told that plans would be put on the market within the next 6 months. Some components, including welded up fuselage frames, might be available, if there is enough demand.

A company has been formed to market the Invader (apparently the tri-gear version, the Mk. III). For more information, write: Ultra Efficient Products, 1637 7th St., Sarasota, FL 33577.



PTIGER



Jack McCornack



Although the companies involved don't want to talk about it a lot, it is common knowledge that several are testing **aerobatic** ultralights. One of them is already on the market and was at Sun 'N Fun — Jack McCornack's Ptiger. Essentially a beefed up, shorter span Ascender with a foam and glass fuselage, the Ptiger was designed for 9 Gs . . . **however**, McCornack stresses very strongly that flight testing as of Sun 'N Fun time had not seen the performance envelope opened beyond 5 Gs.

Powered by a Cuyuna 430 (Jack was the one who first modified the Cuyuna for ultralight use), the Ptiger has a red line of 80 knots, a cruise of 50 knots at less than half throttle and it stalls at around 30 knots. Rate of climb is 600 fpm in standard conditions.

The fiberglass fuselage is derived from Larry Haig's Minibat — courtesy of Larry — and is fitted with a tricycle gear. The mains are mounted on two fiberglass rods that with the low pressure tire deflection, have a total of 6 inches of suspension travel. Jack says he still is not enamored with airports and wants to retain the rough field capability of his earlier Pterodactyl models. The nose wheel is also a low pressure tire and is non-steerable. There are

brakes on the main wheels which are differentially actuated just like those on a VariEze — they begin working at about half of rudder pedal deflection. In turns, the fixed nose gear sort of squishes around, he says.

The Ptiger utilizes its canard surface for pitch control, spoilers for roll and tip rudders for yaw. A side mounted stick and rudder pedals are hooked up in the normal fashion. (It's necessary for me to keep saying this because so many ultralights still have non-standard control systems.) A clue to the purpose of this aircraft is the fact that the cockpit is fitted with a full aerobatic seat and shoulder harness plus a Security parachute.

As you can see in the picture, the Ptiger has an N number. It is licensed as a homebuilt — as Jack McCornack's personal airplane — and he was issued a Repairman's Certificate upon its completion. He has a Student license and it had an instructor's endorsement for a cross country flight from California to Florida and return . . . although Jack chose not to exercise it. Instead, he came airline to Tampa, with the Ptiger in the cargo hold as "sporting goods". It was assembled at Tampa International and after Jack explained to every security

guard on the airport at least once that with an N number, his machine was legally an airplane rather than an ultralight, he was allowed to take-off and fly to Lakeland.

Asked by some of the bystanders about the Ptiger's aerobatic capability, Jack emphasized that the airplane was still undergoing flight testing, but at that point, the only maneuver **NOT** recommended was the tail slide. This causes the tip rudders to clang open, he explained, resulting in a sort of hammer-head turn, the direction of which is not predictable.

Why an aerobatic ultralight? Well, if people want them and are willing to pay for them, someone is going to build them — it's as simple as that. Four Ptigers are already flying and two new ones will soon start out on an attempt to fly around the world. Jim Campbell and Pat Trusty (a female Pat) are going to give it a whirl and should be crossing the U.S. from California about the time you are reading this.

Jack McCornack is founder and president of Pterodactyl Ltd., Box 191, Watsonville, CA 95076 (408/724-2233). Write for a list of his dealers if you want to examine his machines more closely. 🐉

KOLB ULTRA STAR

Homer Kolb is the fellow who had been building and flying "lighter than man" aircraft on his farm near Phoenixville, PA since 1962 when the modern ultralight era began. He watched the kids fly their powered hang gliders at Oshkosh for a couple of years and, unable to stand on the sidelines any longer, finally brought his Flyer to the EAA Convention in 1980. A pilot since he was 16 and the builder of conventional homebuilts like the Cassutt racer, it was only natural that he would have a different design philosophy than the hang glider oriented, mostly west coast designers . . . and it showed in his Flyer. With strut bracing, doped Dacron covering, welded 4130 steel fuselage, 3-axis controls and (gasp!) a tail dragger landing gear, it **was** different. It also performed differently than many of the "flying lawn chair" types . . . it taxied with ease, handled a higher crosswind component than most and performed as well or better than its draggier contemporaries on two dinky little chain saw engines.

The hang glider oriented types really didn't know what to make of Homer and his Flyer at first — but a lot of his fellow EAAers did. Licensed pilots saw the Kolb Flyer as an airplane — something with the type of controls they were accustomed to, something they believed

they could fly without having to unlearn a lot of their past flying experience. So, they put Homer in the plans and kit business and have been running him ragged ever since. 90% of his customers are already pilots, but he does have some newcomers as customers. His engineer, Dennis Souder, was not a pilot when he came to work for Homer, but soloed himself after two 15 minute training sessions — and three weeks later was flying in the air show at Tullahoma. "Everybody thought he was a pro," Homer says with a chuckle.

The Flyer has been quite popular in foreign countries — for reasons Homer has not completely fathomed as yet. Apparently, they, too, like conventional aircraft controls.

At Sun 'N Fun '82 Homer showed up with a new airplane he calls the Ultra Star. It is an evolution of his Flyer, featuring folding wings, full span flaperons and a single 30 hp Cuyuna 430 engine mounted behind the seat. The span has been reduced from the Flyer's 29 feet to 25.5 feet, but may be increased to 27 feet for better performance on floats. All hardware — control cables, pulleys, turnbuckles, etc. — are aircraft quality and the covering is Stits 2.7 oz. fabric, pop riveted (rather than rib stitched) to the wing ribs. Tires are off the shelf wheel-

barrow units on special narrow rims. Effective . . . and cheap!

Both Kolb designs are or, in the case of the Ultra Star, **will** be available as kits — in 3 packages or 100%, if one prefers. The Flyer, with Solo engines, sells for \$2495 — complete. You do have to weld up the fuselage frame, but with so many of the ready-to-fly ultralights now selling in the 5 to 6 thousand dollar range, it's obviously a very good buy. There is, as a matter of fact, a lot of muttering about the ever-escalating prices of ultralights these days . . . but there are alternatives as Homer points out. And there are still a lot of scroungers out there, he has found, so Homer will sell you plans only — for \$65.00.

As of Sun 'N Fun, the Ultra Star was still under development — although flying regularly. Like everyone else, Homer is waiting for the FAA to act on its ultralight NPRM and he wants to keep his options open in case he needs to take off a few pounds on whatever. If no action has been taken by Oshkosh time, he likely will freeze the design and market it — as a homebuilt, if necessary.

You can contact Homer at Kolb Company, Inc., R. D. 3, Box 38, Phoenixville, PA 19460.



Homer Kolb

PHANTOM



John Dempsey

One of the most impressive of the new ultralights at Sun 'N Fun was the Phantom, designed and built in its entirety, including the sail, by John Dempsey, chief designer of Ultralight Flight, manufacturer of the Mirage.

The Phantom is, in concept, a logical progression from the Mirage. It utilizes the same materials and a number of the same design elements (i.e., wire bracing, shock mounted main gear, etc.), but goes considerably beyond the Mirage toward being a very light airplane. Changes include full span ailerons instead of spoilers for roll control, a single tail boom rather than four small diameter tubes, a tractor propeller in place of the shaft driven pusher prop of the Mirage. And to make the pilot feel a little more at home in the cockpit, he has a fiberglass fairing in front and partially around him, plus a large windshield. Of tough Lexan, the windshield deflects the prop blast, oil drippings and any stray nuts, washers, hard shelled bugs or whatnot that might get rifled back by the propeller.

The control column is of the dreaded overhead yoke variety — dreaded because the input/response is "backwards" — actually upside down — to experienced pilots. John has pretty well eliminated that problem by mounting a wheel on the end of the yoke. You turn the wheel left or right for aileron and pull back on it for "up" elevator — just as in any wheel controlled airplane. Rudder pedals work in the normal manner, including "right way" nose gear

steering.

Both pull-start and choke cables run down into the cockpit so engine starting can be accomplished **after** the pilot has strapped in and has the brakes set . . . rather elementary for "real" airplane pilots, but not that common yet in ultralights.

The Phantom is powered by a 430 Cuyuna (30 hp at 5500 rpm) swinging a 58 inch 30 pitch wood propeller — through a 2 to 1 reduction system. My observation at Sun 'N Fun was that the Phantom was one of the quieter ultralights there. A 4 gallon fuel tank is mounted behind the pilot's seat and a fuel pump pulls the oil/gasoline mixture up to the engine.

The wing construction is what we can now call "standard" ultralight practice. Each panel consists of two aluminum tubes, one serving as the leading edge and, in this wing, the other as the aileron spar. They are connected by two compression struts and a tip rib, plus drag and anti-drag wires. The airfoil shape is achieved by inserting curved aluminum tubes in pockets or sleeves sewn into the sail or wing covering. There are 32 such ribs in the Phantom's wings. It's scary when you look inside one of these wings (and most of the ultralights use this type of construction) because there is virtually nothing inside. The strength, of course, is in the wire or strut bracing. Like the Mirage, the Phantom has a rather tall king post so that generous triangulation of the brace wires results.

The full span ailerons and tail sur-

faces are aluminum tubular frames with double surface covering so tight it appears doped. It isn't — all the flying surfaces are covered with the usual "zero porosity" dacron sailcloth — but John has developed a technique for assembling the surfaces so that the covering is pulled very taut in the process.

The Phantom is a rather compact little machine. Span is 28 feet and the length is 17 feet. Wing area is 142 sq. ft. All I could get out of John on empty weight was "220 pounds", which is the answer I got for **many** ultralights at Sun 'N Fun — for obvious reasons. Wing loading is "about 3 pounds".

The Cuyuna can pull the Phantom out to a max level speed of 70 mph, but normal cruise is in the 40 to 55 mph range. The airplane stalls at around 25 and never exceeds is pegged at 80 mph. I commented favorably to John on what I had observed to be an excellent rate of climb — one which appeared to be sustainable for quite a while — and he replied that in the below sea level density altitudes of a Connecticut winter, he had measured 1500 fpm (best rate). It was, of course, less in Florida's near 90° temperature, but impressive nevertheless.

At present the Phantom is an R&D aircraft, but will go into production eventually, John said. He and Ultralight Flight . . . and a host of others . . . want to see what FAA is going to do relative to ultralights before they make their move.



CGS HAWK

With all the spectacular new ultralights at Lakeland this year, being picked as Best New Design was a significant achievement, indeed. That honor went to CGS Aviation for its new Hawk . . . but to everyone who knows the personalities involved, that means Chuck Slusarczyk. The design was his concept and he deserves and will get the credit.

So, what's so great about the Hawk? Well, it's an extremely versatile design that covers about every base you can think of. Consider:

- It's an airplane — with normal 3-axis controls. Stick in your right hand, throttle in left, feet on rudder pedals — just like a Cub. It also has a hand brake — just like a Tri Pacer or early Cherokee. It has flaps — just like a 150.

- You have your choice of tri-gear or taildragger configuration.

- You can cover it with zero porosity Dacron sail cloth, or you can put on a conventional dope and fabric job.

- You can have single place . . . or, ultimately, two-place tandem, like a Cub.

The idea, Chuck says, was to design a machine for pilots that would require no transition whatever — just strap in it and go flying — yet, would utilize the relatively cheap and easy methods and materials ultralight designers — and hang glider designers before them — have developed over the past decade. The powerplant would, of course, be one of the 2-cycle engine/reduction unit packages already in use in ultralights.

To cut initial cost, the Hawk will be marketed as a kit . . . with not a great

deal to do other than bolt and pop rivet together. Almost all the required holes will be predrilled. Construction is essentially aluminum tubes of various diameters attached to each other by gussets and pop rivets. The biggest job would be in installing the engine, control cables and, should you choose that option, the dope and fabric job.

Under development for about a year and a half, the first Hawk flew in February of this year and the second one, the one you see pictured here, flew two weeks before Sun 'N Fun. Both aircraft were at Lakeland, the first (yellow) one on static display and the second (blue) flying every day. The yellow one had been flown 40 hours, the blue one 20. Chuck had the invaluable assistance of his long time friend and mentor, Webb Scheutzow, in the creation of the Hawk. Webb did the stress analysis and was always there to advise on bracketry, systems, etc. Webb designed and certified the Scheutzow Bee 2-place helicopter, so was well acquainted with the nuances of FAR Part 23, to which much of the Hawk was designed. The structure was designed to +6 and -4 Gs, and has been load tested to +4 and -3 with no deformation.

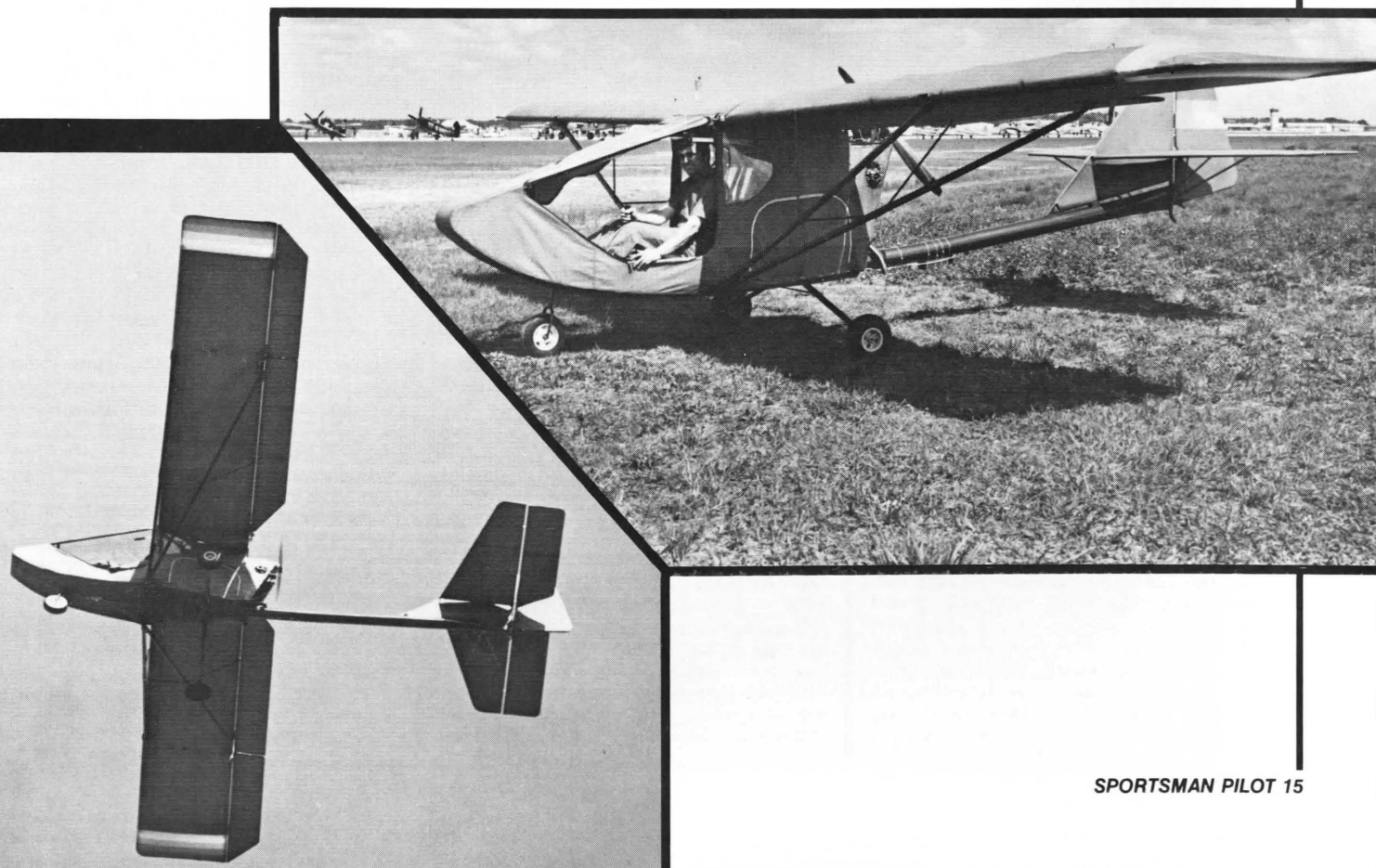
When the prototype was ready to fly, CGS officials told Chuck to hang his goggles back on the wall. The tragic lesson of John Chotia's death was more than enough for them to hire a test pilot. Terry Fuller, a cool, competent pilot was brought in to fly the airplane, leaving the brains behind it safely — even if a little disappointed — on the

ground. As events transpired, the Hawk has had no real problems, but, in retrospect, Chuck realizes the decision was the right one. Too much, businesswise, was at stake to have someone at the stick worrying about — what else? — how much was at stake.

The Hawk kit is initially priced at just under \$5000, minus instruments. This, I think, is going to rattle some cages in the ultralight industry. There are a bunch of far less sophisticated machines out there selling for more than the Hawk kit . . . now. The Hawk is exactly what licensed pilots have been saying they wanted in an ultralight and I think it will sell like hotcakes. As soon as it hits the market, I suspect we are going to see some rapid, shall we say, price realignment.

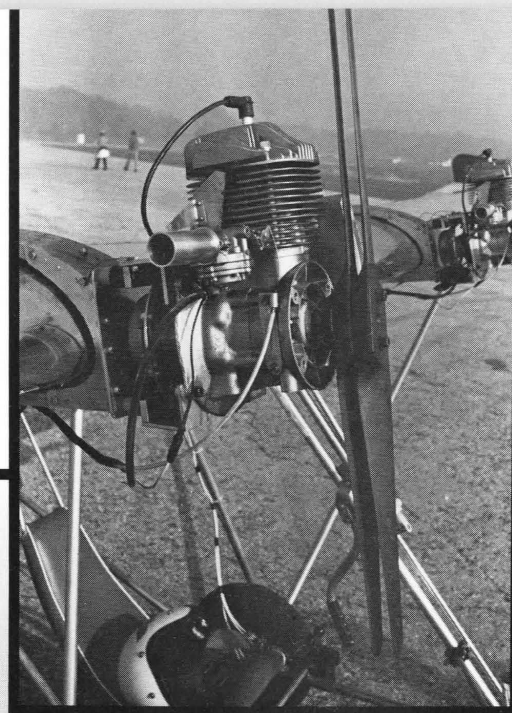
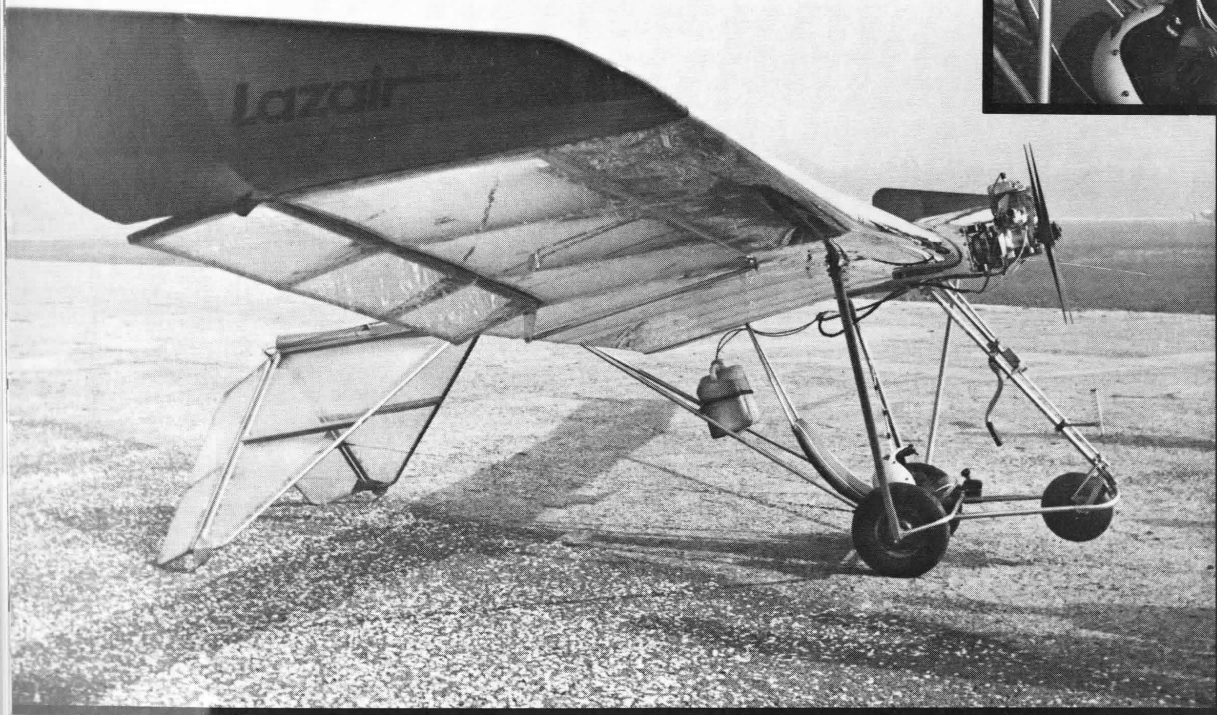
The Hawk has a span of 29' 3", is 20' 5" long and weighs 218 pounds. Top speed with a Kawasaki 440 is 70 mph. Cruise is 55 and it stalls at 25 mph. Wing loading is 2.8 pounds per square foot (wing area 145 sq. ft.) with a 180 pound pilot.

Needless to say, Chuck was elated with the Best New Design award at Sun 'N Fun . . . but it was a bittersweet occasion. On Friday morning it was discovered that Webb Scheutzow had died in his sleep in his motel room. He lived to see the Hawk fly, however, and he knew it would be a great success. He had made his contribution to the furtherance of personal flight . . . and regrets are only for those of us he left behind.



LAZAIR

Update



Since it was introduced to the sport aviation world at Sun 'N Fun in 1979, the Lazair has undergone progressive development to make one of the very best ultralights even better. Improvements include large flotation tires for rough field operation, a kit for "bent down" tubes in the cockpit area to provide more shoulder room, a rigid seat, a locking device on the control stick which allows the pilot to interconnect the rudder and elevator (like an Ercoupe) or disconnect them for separate operation. The latter, in concert with newly installed rudder pedals, permits 3-axis control. The most recent improvement is the substitution of 9.5 hp Rotax engines for the 6 hp Pioneers previously used. This led to a rather startling discovery. Lazair has been using injection molded props of its own design and manufacture for the past 4 years, but it was realized that new props would have to be developed for the more powerful Rotax engines. First, however, an attempt was made to save the tooling investment in the Pioneer props by bolt-

ing a second one on in front of the standard prop — to create a sort of offset 4-blade prop. Lazair principals Dale Kramer and Peter Corley were pleasantly surprised to find this second prop increased static thrust from 45 pounds (single prop) to 65 (two props). Bolt-ing two props to the same hub is not really new — you can see several examples of it on pictures of World War I airplanes, for example, but Lazair added a new twist (pun intended). They decided to shift the props around relative to each other to determine if any one position produced more thrust than any other. They found there was no change regardless of where the 2nd prop was bolted. This fortunate little revelation meant they could simply bolt one prop right over the top of the other, length-wise — as you see in the accompanying picture. The 65 pounds of thrust are still obtained and the props have the advantage, in this configuration, of creating less drag when the engines are shut down for soaring. The props, incidentally, are a 40% carbon fiber/60%

nylon mix that have given excellent service. With this newfound thrust, Lazair has developed its own set of floats. The aircraft is simply lifted and placed atop the floats, the nose strut is clamped to a fitting and the wheels are cinched down with bungee cords. In about 2 minutes one is ready for water flying.

Peter Corley is chief test pilot for Lazair and has spent 800 hours flying the agile craft. I asked him what percentage of Lazair customers are already pilots — to which he replied, "95%". Apparently Lazair, with its airplane wing and consequent "airplane" look has always found favor with licensed pilots. It was for them, in fact, that the rudder pedals (and 3-axis control) were added. Peter says that with the new Rotax engines, the Lazair was faster than anything (ultralights) at Sun 'N Fun except the Goldwing and the new Hawk . . . and could fly slower than any of them.

Lazair has a \$5.00 info pack, available from Ultraflight Sales Limited, Dept. B, P.O. Box 370, Port Colborne, Ont., Canada L3K 1B7. ☛



GRAND CHAMP KB-2

Few realize that the KB-2 gyroplane Ken Brock uses in his spectacular air show routine is one of the oldest of the type in continuous use. One would assume that since he manufactures them, he would have a new KB-2 every year, but not so. He has a sentimental attachment to his "Black Beauty" that has caused him to hang on to it probably a little past its prime. This is the same machine Ken flew from California to Kitty Hawk, NC a decade ago and it has been involved in a number of other rotorcraft records. Finally, though, his friends(?) harassed him into building a new one for himself . . . so Ken thought, "O.K., you guys, you want to see a new KB-2 — I'll show you what one REALLY should look — and fly — like!"

And did he ever!

The new one naturally incorporates the very latest KB-2 components and is finished in Ken's trademarked black and silver. The tail surfaces and seat tank are black and every other part of the airframe, including the rotor blades, is either chromed or polished to the luster of chrome. It sparkles in the sun like a diamond — and when Ken's up flying his air show routine, it glints and flashes

like a battery of strobe lights. It's a real showpiece — and to no one's surprise, was declared Grand Champion rotorcraft at Sun 'N Fun '82.

Good as it looks, however, the real story of this new KB-2 is in its performance. Assuming you have a top notch engine (Ken does) and a finely tuned set of rotor blades (he does), about the only thing left one can do to improve performance is reduce empty weight . . . so Ken went all out on this score. First, his old all-composite tail was replaced with a new all metal one — saving about 5 pounds. It's flush riveted and finished so nicely you'd swear it's still plastic. Next came some new lightweight wheels that saved a surprising 10 pounds. The nosewheel is the 4 inch unit Ken supplies for the VariEzes and Long-EZs — and as the main gear wheel for the Quickie and Mead Adventure. The 5 inch mains are new wheels for which a new lightweight hydraulic brake system is being developed for aircraft use. The wheels are not only light, but have sealed tapered bearings that make them roll easier than the ones they replaced.

A few other things were done — the engine mount is slightly lighter, for exam-

ple — and the final result is the best power-to-weight ratio Ken has had the pleasure of flying in a type of machine that is already a little powerhouse. What does it do for him? Ken says, "Well, the climb performance is just fantastic. I can hold the machine in a nose high attitude in a vertical descent — which is zero airspeed — and just apply power and without dropping the nose, it will **climb** right out of it." In airplane terms, this is the equivalent of popping the throttle open and instantly **climbing** right out of a full stall . . . which tells you what a little rip snorter he really has.

The new KB-2 is actually the latest model of the type. If you buy one now, the kit will contain the lightweight wheels, metal tail, etc. If you want further information on the KB-2, check Ken's ad on the back cover of this issue.

Ken's old KB-2, incidentally, will be donated to the EAA Museum this summer — sometime during the Oshkosh Fly-In in early August. It will have a place of honor in the new EAA facility being constructed on Wittman Field.



Ken Brock, right, and his Grand Champion KB-2 with Larry Newman and his new KB-2.



A Clipwing Revisited



If you wanted to build a case for reincarnation, the Clipwing Monocoupe would provide some persuasive evidence. The prototype and seven production aircraft were built between 1932 and 1950 . . . four of them crashed, killing their pilots and totally destroying the airframes . . . yet, there's nine of them around today!

Fortunately, we don't have to delve into the supernatural to come up with an explanation for this rather strange anomaly. It's much less dramatic than that — simply a matter of a small but incredibly devoted cult of Clipwing lovers who refuse to let the airplane die. They've done so by rebuilding the wrecks or, in the case of total destruction, simply building a new airplane "from the nameplate out", as the saying goes. At least three Clipwings are "new" ones, in the sense that they do not use an old factory N number or serial number. Instead, they were simply built up out of a 110 in one case and from 90As in the case of the other two. Johnny Livingston created the Clipwing or, more properly, 110 Special in 1932 when he had his stock 110 "chopped and channeled", so there is honorable precedent for the three "new" ones.

The last Clipwing to leave the Monocoupe factory — in fact, the last Monocoupe, period — was 16E. To my pleasant surprise, it turned up at Sun 'N Fun in mid-March — the first time I had seen it since Rockford in the late 1960s. The airplane is now owned by Bill Hutchins, Jr., a DC-8 captain for Braniff. It is hangared at a private strip near Boca Raton, Florida. Bill, Jr. was accompanied by his father, Bill, Sr., who owned the airplane in the 1960s. Now retired from Pan American, Bill, Sr. has a beautiful Bucker Jungmeister in which to while away his idle hours (we should be so

lucky!), so he gave the Clipwing to his son. There's a little more to it than that . . . but, first, let's turn back the clock and take a quick look at the chronology of this mean little machine.

In the late 1940s, a fellow named Carl Poston ran an operation on an airport at Lynchburg, Virginia. One of the airplanes he maintained was Woody Edmundson's legendary "Little Butch", the Monocoupe 110 Special with which he (Woody) won the World's Aerobatic Championship in 1948. Woody would occasionally take Carl out for a spin . . . and a loop and a roll as well! Soon, Carl was lusting for a Clipwing of his own, but none was to be had. Monocoupe was still in business (just barely) in Melbourne, Florida, so he gave them a call to see if they would build him a new 110 Special. Reportedly, all he got was a horselaugh from factory officials, but after several more inquiries, they realized this fellow from Virginia was serious. Well, if you insist, they told Carl, we'll build you one . . . but you'll have to put up half the purchase price before we start cutting metal. Carl hopped in his Bonanza, flew down to Melbourne and plunked down his cash before they could change their minds.

Soon, however, while Carl was awaiting the completion of his Clipwing, Woody Edmundson stopped in with the ominous news that Monocoupe was about to go belly up. Woody advised Carl to rush down to Florida and retrieve whatever had been built to that point before the sheriff padlocked the factory doors. He did just that, hauling back the fuselage frame, an almost complete wing and partially completed landing gear to his shop in Lynchburg. The airplane was completed there and test hopped by none other than Woody Edmundson, himself.

A few years later, Carl moved to the Miami area and, of course, brought the Clipwing with him. He loved the little son of a gun and put about 250 hours on it before he developed cataracts and had to give up flying. Basically an engine man, anyway, Carl stayed in the aviation business, but had to put the 'Coupe in storage, much to his regret.

Meanwhile . . . in a parallel life stream, a Pan American captain named Bill Hutchins had also moved to Miami, in his case from Illinois. He owned a 90A Monocoupe and had lately been taking great pride in teaching his son, Bill, Jr., to fly in it. Young Billy soloed in the 'Coupe when he was 16 and went on to get his Private and Commercial licenses in it. In fact, he had 400 hours before he flew anything else.

Somewhere along the way, father and son decided they wanted to install a bigger engine in their 90A, a Warner radial, preferably. They had heard about Carl Poston, so they paid him a visit to try to buy an engine. One look at the dismantled Clipwing, however, and all thoughts of an engine conversion were forgotten. They had to have little ol' 16 Echo!

It wasn't easy. Carl really didn't want to sell his pet . . . but, after a year of persistent cajoling, he let the Hutchins buy it. That was in 1964. About a month was spent assembling and cleaning up the Clipwing — then Bill, Sr., just went out and flew it.

In 1966 Bill and Bill, Jr. flew 16E to the EAA Fly-In at Rockford, IL — and one of the first persons to greet them was none other than Johnny Livingston. A very successful Waco and Monocoupe dealer in Iowa in the late 20s and early 30s, Johnny was also an air racer of considerable note. He won a transcon-

tinental race in 1928 in a Waco Taperwing and when Monocoupe came out with the Model 110, he began racing it with notable success. Johnny was a gifted pilot who seemed to have a sixth sense when it came to things like drag reduction, vibration, etc. He had no formal training in engineering, but somehow could "feel" little tremors and rumbles pulsing through an airframe that ordinary pilots miss . . . and being a perfectionist by nature, he methodically tightened this, loosened that, put a fairing on something else until he isolated the source of a particular vibration or unwanted eddy of turbulence, then came up with a fix of some sort. (It was, in fact, this relentless drive for perfection that later inspired author Richard Bach to title his book and its central character "Jonathan Livingston Seagull".) He worked for 3 years to squeeze every mile per hour out of his 110, culminating the process by ordering a new wing from the Monocoupe factory, clipped down from the normal 32 feet to 23 feet 2.5 inches. This was the first of the legendary Monocoupe 110 Specials or simply "Clipwings" as most aficionados call them. Unfortunately, the pure racing aircraft Johnny was competing against were getting faster also, so that at the peak of its development, the Clipwing was no longer competitive. Johnny couldn't stand that, so he sold the airplane to Jack Wright and ordered a pure racer for himself — from Clyde and Eldon Cessna.

Wright, meanwhile, sent the airplane back to the factory for some work and got it certified on what was known then as a Group 2 approval, a sort of addenda to a normal ATC for special purpose airplanes. Now able to compete in ATC class races, Wright was able to mop up the competition. He even entered the airplane (sponsored by the Baby Ruth candy company) in the London to Australia MacRobertson air race, but had to drop out along the way. The airplane had been so successful, however, that Monocoupe began manufacturing 110 Specials on a special order basis.

Johnny, meanwhile, had to bail out of his Cessna, after which he dropped out of racing and became an engineering test pilot for Waco. He didn't race again until 1939 at Miami. There, in a borrowed Clipwing, he won two feature races . . . illustrating rather dramatically that he still possessed the right stuff (as Tom Wolfe would put it today).

So far as is known, Johnny never sat down in another Clipwing until 1966 . . . when he crossed paths with Bill Hutchins at Rockford. Johnny wanted to fly 16E badly . . . and Bill wanted to see him fly it — and sign the plane's logbooks — so there was nothing left to do but fly down to a little duster strip near Rochelle, IL and have at it. Johnny was nearly 70 at the time, but he looked and acted more like 50. He strapped into 16E, blasted off, put on a 15 minute aerobatic show and slipped it back in over some powerlines as if it had been 27 minutes since he had last flown a Clipwing . . . not 27 years!

Bill, Sr. at that point still had not



soloed his son in the Clipwing, despite his rather extensive 90A time, so in the midst of all the excitement of having Johnny Livingston fly it, he weakened and strapped Bill, Jr. in for his own thrill of a lifetime. With aplomb of his own, young Bill flew 16E for about an hour — and landed with as wide a grin as Johnny's. It was a great day for all — one Johnny talked about for the rest of his life, and one which both Bills will treasure throughout theirs.

Those last Rockford years were happy, nostalgic times for Johnny Livingston. He was being "rediscovered" by a new generation of aviation enthusiasts and was getting to relive some wonderful experiences. The next year, for instance, he got to fly the Taperwing Waco in which he had won the 1928 transcontinental race — then owned by Dave Jameson. He also flew Dick Austin's newly restored D-145 Monocoupe . . . and, predictably, advised a few rigging changes to increase its speed. In his last years, spent largely in Florida, he became something of a Pitts authority, test flying them and rigging them to perfection. His last earthly act was to roll out to a stop in a Pitts

. . . the Right Stuff to the absolute end. 16E flew for a couple more years, but finally its 1950 fabric gave up the ghost. It was turned over to a fabric man in the Miami area, but he developed arthritis during the project and had to quit work. 16E sat in his shop for nearly 5 years before it was finally retrieved and taken to Winter Haven, FL to be finished. In 1978 16E finally got back in the air again . . . now owned by Bill, Jr.

It was my good fortune to have been there in Rockford in the late 1960s for the Johnny Livingston episode in the life of 16E. As a member of the antique judging team in 1968 and chief judge in 1969, I made Johnny an unofficial member of our group, hauling him around with us as we judged. He was an absolute gold mine of technical lore, especially on Monocoupes and the cabin Wacos . . . and he never got over the thrill of flying 16E after a 27 year layoff from Clipwings. I heard the story dozens of times and enjoyed it on every occasion. Perhaps, it was for that reason that it was a special thrill for me to see 16E again at Sun 'N Fun '82. It brought back a lot of treasured memories. ☺

His Honor,



Johnny Murphy

Among us rotten-to-the-core, hopelessly fanatical airplane nuts, the stock answer to the question, "What kind of airplane would you like to have?" is, "One of each!" For most of us, that's just wishful thinking . . . darn it . . . but for Johnny Murphy, who just happens to be the mayor of Cape Canaveral, Florida, it's a one-liner that comes tantalizingly close to being the *modus operandi* that has guided his aviation career over the past 37 years.

Consider . . . Johnny learned to fly in 1945 in a Piper J-5 and spent the late 40s and early 50s like a foodaholic turned loose in a cookie factory. Avgas was 19 cents a gallon and war surplus airplanes were cheap, cheaper and how-much-can-I-pay-you-to-haul-this-off-my-ramp? Johnny actually doesn't remember how many airplanes he owned during that period, but among his favorites were a couple of Stearmans, a T-6 and a Wildcat. Others included a Bamboo Bomber, a Piper Super Cruiser and even an Ercoupe.

"I had a passel of airplanes right after

World War II," Johnny recalls, "and to tell you the truth, I had a ball!"

His only regret, if you can call it that, is that he didn't salt a few of them away as investments. The Wildcat, for instance, was unloaded, gratefully at the time, for a thousand bucks.

"It's worth over a hundred thousand today!", he groans.

In those days, Johnny was buying, selling and flying mostly, but he did get into restoration pretty early in the game. In the 1950s he bought a Staggerwing from a fellow who had purchased it in Miami from deposed Cuban leader, Fulgencio Batista — for \$450.00. Three years were spent rebuilding the airplane to mint condition, after which it was ultimately sold for \$3500.

More groans!

Johnny, incidentally, is a native of Augusta, Georgia and an engineering graduate of Georgia Tech. For some 7 years he worked in an Army R&D lab in Washington, DC, but when the space race began in the late 1950s, he went to work for the newly formed NASA and

moved to Cape Canaveral, where he still lives today. A design engineer on ground support equipment for the space program, he has had a ringside seat for the U.S.'s entire space effort. Just has to climb atop his roof to watch the launches. Three years ago he was elected mayor of the town of Cape Canaveral and just last September, he retired from NASA.

All the while, Johnny was also developing a strong interest in homebuilts. He occasionally bought a set of plans for some design that had caught his eye . . . but never started building anything. The three years he spent "cutting out all those tiny little parts" for the Staggerwing had cooled his ardor for complex, lengthy projects . . . so, most of the plans are still in his closet at home.

"Then, I went to Oshkosh in 1976 and bought a set of Burt Rutan's VariEze plans. After studying them, I realized I had found my airplane — one that could be built in a reasonable time, one without a million little parts to cut out and glue or weld together. I flew it to

Oshkosh in 1977, a completely original VariEze — no ailerons or belly board air brake. Burt liked to died! It was updated after I got back home, but I flew it 70 hours without ailerons!"

In fact, Johnny was so sold on composite construction that in subsequent years he has become the "composite king" of homebuilders, building in succession, a Quickie, Long-EZ, Mead Adventure and, currently, he is finishing up a Glasair!

His was the first plans-built Long-EZ — and that's stretching the facts a bit. "Burt graciously allowed me to build a sort of 'proof of plans' version, with me beginning work even before the plans were finished. He would send me handwritten information, mock-up drawings, etc., to keep me going. Nevertheless, mine was the first true Long-EZ — the first with a Long-EZ center section. Burt's was really a pre-prototype — he used it to try out all sorts of new ideas, including several sets of wings.

"Anyway, I finished it and, boy, is that Long-EZ a super good airplane! Might just build me another one. I recently sold both the VariEze and Long-EZ because I had some new projects to build and was running out of hangar space. I still have access to the Long-EZ if I want to fly it, so I didn't divorce it completely.

"Just before I sold it, I flew the Long-EZ out to Mojave to visit Burt. With Tim Gehres in the back seat, I left Cape Canaveral at 6:30 in the evening and landed at Mojave at 10:30 the next morning! Just turned on the autopilot, sat back and sipped coffee and moved on out there. I went straight from Orlando to New Orleans — right over the Gulf. We stopped once — at Midland, Texas — for fuel. The CompuCruise I had in it said I needed 57.1 gallons. It took 57.3. We were fighting a headwind all the way.

"We had a great time at Mojave. Flew over to El Mirage to attend Ken Brock's annual Thanksgiving party . . . and got to fly the Defiant while I was out there. It's a super airplane. Had a tailwind on the way home — averaged 218 mph groundspeed from Tucson to Tallahassee, burning just 6.5 gallons per hour. That Long-EZ is something else!"

The next composite project was a Mead Adventure, which he had at Sun 'N Fun.

"I bought the plans from George Mead here at Lakeland two years ago — serial number 13, in fact. I didn't start it right away because I had some other projects going. Eventually, a good friend of mine, Paul Charles, who is also a retired NASA employee, needed something to do, so we started the Adventure on a sort of low key basis. I had a lot of blue foam left over from my Eze projects — enough that we had a good start on the airframe before we had to buy anything. We built it in 13 months, almost entirely in Paul's backyard. It's the first plans built Adventure to fly, as far as we know.

"It's powered by a Continental A-65, uprated to 75 horsepower. It indicates 150 mph at 2300 rpm and 182 wide open.

That's with a 62"x65" wooden propeller. It's a good flying little airplane but there is one thing I should pass along to others who are building Adventures. The main gear should be installed so that the wheel centers are back about 2 inches further than shown on the plans. This doesn't change the mounting of the gear legs to the fuselage, just the angle of the legs. Right now, if you are taxiing ours at, say, 25 mph and hit a pebble with the nose gear, it will pop the nose up and the tail will hit the ground. You have to give it a blast on the throttle to get the nose back down. Other than that, it's a good little airplane with a lot of performance for the power.

"We had to do a little cut and fitting with the baffling and inlet sizes to get the updraft cooling to working right, but it's O.K. now. Updraft cooling is definitely the way to go.

"We came out at 490 pounds empty weight. It stalls at about 62 mph and I can land and turn off in 1500 feet without trying real hard. I nail my approach at 80 to 85 and when I flare, the speed bleeds off rapidly. I touch down at about 68 or so.

"It really goes up — up to 2000 fpm with the prop we've got on it. Also, it has a very effective set of Fowler flaps. With 15 degrees, it really climbs, even with the small engine."

The Murphy/Charles Adventure carries 22 gallons of fuel so has good range burning 4.5 gph.

Currently, Johnny is building a Glasair and is close enough to completing it that at Sun 'N Fun in mid-March he was confident he would fly it to Oshkosh this summer. Asked to make the inevitable comparison between the Rutan solid core or moldless foam and glass construction with the Glasair's molded shell technique, Johnny had this to say:

"Well, I build airplanes because it's fun. Each airplane has its own design compromises to optimize certain characteristics, so every airplane has its advantages and disadvantages. I thought the Glasair was a pretty airplane when I saw it at Oshkosh year before last, and I ordered a kit which was delivered a year ago this month (March). Compared to the Glasair, the Long-EZ is a picture of simplicity. Now, this doesn't mean there's anything wrong with the

Glasair. There's not . . . it's just different. It's designed to go fast — that's why I bought it. I want to go 220 mph. Actually, I want to go 300, but no one is making such a homebuilt.

"The construction is an entirely different approach. In Burt's designs you build up and shape a solid foam core, then fiberglass the exterior. With the Glasair, Tom Hamilton provides you with beautifully molded shells and you build all the little pieces that go in the middle. Then you glue all the parts together and finish the taped seams. It's a lot bigger job than you expect in the beginning. The finish of the molded parts is so good that you have to really work to get the taped areas to match — 320, 400, 600, 800, 900 sandpaper and, finally, generous use of rubbing compound.

"After a year's work, I have my Glasair on its gear and the Lycoming O-320 hung, but not plumbed. I've learned my lesson when it comes to making changes — really caused myself a lot of extra work in some of my earlier homebuilts — so I'm not changing **anything** in this one. Everything has gone together with surprisingly few problems, considering this is one of the early kits. There are always a few little things that don't work or fit in the original plans or builders' instructions in **any** program. I **only mention this because a person building an airplane for the first time ought to recognize this and not get all teed off at a designer because he didn't think of this little detail or that. Gosh, in anything as complex as an airplane, there's no way he can think of everything.**"

Words of wisdom from a veteran builder.

Asked what he wanted to build down the line beyond the Glasair — with his track record, you KNOW there'll be others — Johnny says he would love to build Burt Rutan's new powered sailplane, the Solitaire. His **real** dream plane, though, is the Defiant.

"Burt is letting Fred Keller build one, so maybe I'll get to, also. If he does, it probably will be my last homebuilt. It'll do everything I want to do, so I'd just enjoy it, you know."

Sure, Johnny . . . right up to the time Burt . . . or Tom . . . or whoever comes up with that 300 mph job you've just got to have one of. Admit it, you're incorrigible — just like the rest of us! ☺

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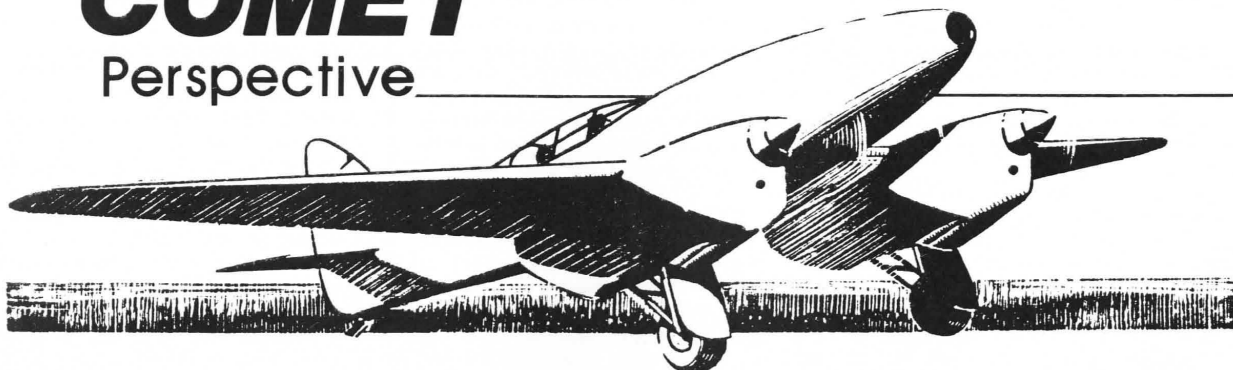
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A COMET Perspective



48 years ago this fall a de Havilland Model 88 Comet won the MacRobertson International Air Race . . . the World's Greatest Air Race it has been called. With a starting point near London and the finish line in Melbourne, Australia, certainly it was the longest.

The story of the race and of the race winners is one of aviation's enduring and inspiring tales . . . how an Austrian millionaire offered a substantial prize for the winners of a London to Melbourne air race to mark the centenary celebration of the state of Victoria . . . how English airplanes were given little or no chance against the spectacular new high speed American transport planes . . . how in a moment of patriotic fervor the de Havilland company offered to design and build a racer capable of winning — in ten months! And how after receiving three orders, Geoffrey de Havilland and his multi-talented design/production team actually pulled it off — designed, built and certified three Model 88s, had them on the flightline at Mildenhall Aerodrome on the morning of October 20, 1934, and 70 hours, 38 minutes and 18 seconds later had one of them, G-ACSS, flash across the finish line in Melbourne the winner, and since there were no reruns of the MacRobertson in subsequent years, the champion to this day.

Oddly enough, though the MacRobertson race was widely publicized at the time and the pride of entire nations rode with their entries, the names of the winning pilots are essentially lost today to all but us aviation buffs.

Charles William Anderson Scott and Thomas Campbell Black never became household words like Charles Augustus Lindbergh or even Roscoe Turner, who finished third in the MacRobertson race. They're better known, Scott and Black, in Great Britain and Europe than here in the United States, of course, but, still, their airplane, the de Havilland Comet, lives on while their memories slip further into the shadows of the past.

It shouldn't be. The Comets were hastily conceived, brilliantly designed and superbly built . . . but they weren't kiddie cars by any stretch of the imagination. That every airplane design is a bundle of compromises is perhaps aviation's oldest cliché, but nowhere is it more apropos than when applied to racers. They are designed to go fast, period . . . and, in the case of the Comets, **they** were designed to go fast for nearly 3,000 miles at a crack. In almost every other respect — safety, comfort, etc. — compromises had to be made.

Remember, the pride of an Empire was at stake . . . duty . . . honor . . . stiff upper lip, and all that.

No, as beautifully sleek of line as they were — and are, even today — and as romantic as they seemed to the world of 1934, streaking across far-away, exotic sounding lands, they were, in the grimly personal terms of the pilots, **racers**. Highstrung, temperamental little beasts, they were ready to bite at the first hint of a slack hand on the reins. We have a natural tendency today, so far removed from the actual events, to gloss over the white knuckle aspects of flying at the cutting edge of technology as it was in the 20s and 30s. We forget that things like flutter were barely understood . . . that pilots were still taxiing out to attempt world speed

records **on tailskids!** It's not enough to simply recount that so-and-so won everlasting fame and glory by whipping around pylons or spanning oceans and continents in a single bound. For real appreciation, we need to put ourselves, vicariously, in the cockpits and examine the human factors our heroes had to live and cope with.

So, let's do it.

There it sits, our Comet. It's high gloss red finish is not what we are accustomed to seeing on an English airplane. Those Americans are the ones who normally go in for that sort of thing, claiming that slick finishes produce a few extra miles per hour, so, although there are doubts by aerodynamists on these shores, de Havilland, leaving no stone unturned to achieve optimum speed, has produced a finish that even that fellow Walter Beech would admire.

It's not a very large airplane, really, with a span of 44 feet and a length of 29 feet — and it looks even smaller. It's rakishly pointed nose . . . and wings . . . and tail surfaces give it a vaguely effeminate air. It's an airplane that's definitely a "she".

And that wing — gad, it is thin! In order to make it strong enough and torsionally stiff enough, de Havilland had to revert to an old boat building technique — diagonal planking of layers of thin veneer strips. Like the old Deperdussin racer fuselages of 1912 that were built in much the same fashion, the result is a one piece, nearly indestructible structure.

It's so thin, however, that all the fuel had to be put in the fuselage. With the pilots. All 258 gallons of it. There are three tanks: one out in the nose holds 128 gallons, another right on the C.G. holds 110 gallons and still another just behind the cabin holds 20 gallons. Sandwiched in between the latter two is a narrow cabin with tandem seating for the pilot and his co-pilot.

To climb in, one has to swing open the one-piece, multi-paned canopy that those with a ghoulish sense of humor have already likened to a coffin lid. Sliding down into the front seat, the first thing that falls to hand, as they say, is a big hand wheel mounted vertically on the right side of the cabin wall. 34 turns retracts the landing gear, we're told . . . and for God's sake, don't forget to do it again, in reverse, before landing! Be careful, too, that you don't bang your elbow on the big horizontally mounted P-4 earth inductor compass right there behind the hand wheel. The P-4 and another just like it in the rear 'pit are all you have with which to navigate through the day and night for 11,300 miles to Melbourne. Treat them gently!

Between your legs there's a stick and a smaller hand brake handle. Your feet are resting on rudder pedals. In front is the usual panel full of instruments, switches and the like. All the engine instruments are in pairs, one for each Gipsy Six. The most sophisticated items are the Sperry artificial horizon and a DG. On the left cabin wall are the two throttles and below them the flap handle. This Comet is one of the first British airplanes with flaps, retractable gear and variable pitch propellers . . . and none of us who are to pilot them in the MacRobertson race have ever flown that combination before.

The rear seat, incidentally, does not contain a gear retraction wheel or flap handle. The co-pilot is back there to spell you when you need a rest, but landings and take-offs can be made only from the front seat.

Finally, you sit up straight and look out. Those highly tapered wing tips are really futuristic to our 1934 eyes, but promise some, shall we say, **interesting** stall characteristics.

Then you look straight ahead . . . great jumping Jehoshaphat! Where did the world go? Boy, you're gonna have to use the Braille system to land this thing! Even Captain Hubert Broad, de Havilland's ace test pilot complained about the poor visibility in the 3-point attitude . . . and, in fact, the canopy was raised an inch and a half, but it wasn't nearly enough. The cockpit is just too far back on the fuselage and the seats are down too low. It's great for drag reduction . . . but, jeez!

Oh well, you sit back and try not to think about the viz . . . as you watch the mechanics pump up the props. That's right, PUMP up the props. The modified Gipsy Sixes on this baby are equipped with French propellers — Ratier automatic two position propellers. Before each flight, the props are pressurized to 80 pounds per square inch, which forces the blades back into low pitch. They will stay there until you're off and speed builds up to about 150 mph. At that point a little flat disc on the tip of each spinner is forced backward, releasing the air pressure in the hubs. This allows the blades to pop out to high pitch for cruise. Trouble is, air isn't always smooth, so all too often the props don't shift gears at the same time . . . but at least you're fast enough by then so that it isn't too much of a problem. Makes you wonder about a bird strike on one of the discs just after lift-off, though.

Worst of all, of course, is that the Ratier is a "one shot" propeller. Once the air pressure is released, the blades stay in high pitch for the rest of the flight — including go arounds, if you have to make them! Jim Mollison put the fear of the Lord into the rest of us when he and his wife, Amy, tried to land their Comet, "Black Magic", at Mildenhall on Monday, the 15th. He was too hot on the first try and really struggled around the pattern — with those props chugging along in high pitch like an MG trying to start off in high gear. He was a little slower next time — but not slow enough. The next week **Flight** magazine described the second go around as one in which Black Magic staggered out "with its tail between its legs, just missing buildings off the end of the runway". Somehow, Jim saved it and came around for a third try. This time he got it down for a pretty decent landing. He had to be pretty embarrassed, what with all the reporters and photographers lining the runway . . . and to make matters worse, when Amy climbed into the front seat the next day to get in a couple of circuits, she proceeded to go out and grease it on the very first time! On Tuesday, Jim demonstrated still another of the Comet's frightening faults — he was holding ol' Magic off nicely on his flare when it dropped a wing on him. He really hit hard, but, amazingly, there was no damage . . . other than to his ego.

Later in the week, Owen Cathcart Jones, pilot of the third

Comet, G-ACSP, must have miscounted on his hand wheel cranking because he didn't get the jackscrews run all the way out by the time he touched down. The gears collapsed and the props got dinged. Only round-the-clock work by de Havilland and the assistance of a French prop man sent over on a moment's notice, got the all-green Comet back in the race.

All the while, additional de Havilland mechanics have been swarming over the other two airplanes, in a feverish attempt to get all the bugs out by wave off time on the morning of the 20th. They naturally spend a lot of time on the tightly cowled Gipsy Sixes. These are new powerplants, just recently developed for the 4-engined D. H. 86 "Express Air Liner". They were warmed up a bit for the Comets — compression was raised from 5.25 to 6.5 to 1 — so that they crank out a maximum of 224 hp at 2400 rpm. The normal rating is 200 hp at 2350 . . . but being normally aspirated, we will only have 160 hp at FULL THROTTLE at 10,000 feet where we plan to cruise whenever weather conditions permit. A total of 320 cruise horsepower is pretty puny compared to those big thundering radials on the American DC-2 and Boeing 247 we know will be our toughest competition. Our only hope is that aerodynamics — low frontal area and our ultra clean wings — can make up for our shortage of horsepower.

Throughout the week, we three crews make familiarization flights as often as possible. The co-pilots are given a chance to shoot a couple of landings, just in case one of us front-seaters has a problem of some sort along the way. (Don't drink the water, they tell us!) We really need to work on things like fuel flow and leaning techniques, because making the 2000 mile plus legs to the mandatory stopping points, non-stop, is essential if we are to beat the Americans. De Havilland has done a lot of bench testing with the Gipsy and everything has been worked out for cruise at 10,000 feet. But what if weather pushes us lower? Will we burn too much fuel down on the deck? How much can we lean at low altitude before we hole a piston? How much effect will the differing grades and qualities of fuels we'll get along the way have on our range? What if we lose an engine — how much will that windmilling (or stopped) propeller slow us down? What kind of single engine ceiling will we have in the tropics? We already know that the engines won't cool properly if the gears are down, so if they don't retract, we are going to have to get on the ground quickly before we cook a cylinder.

Questions, questions . . . we need time to work them out — but we won't get it. On race morning the most "experienced" Comet crew will have just 7 landings between the two pilots.

But, like they say, no guts, no glory. We'll be awakened at 4 a.m. tomorrow morning and promptly at 6:30 the acting Lord Mayor of London will wave off the first racer — Jim and Amy Mollison, it turns out. Have we forgotten anything? Did we remember to stow the bicycle pump in the cockpit so we can pump up the Ratiers en route? Have we got all the charts we'll need?

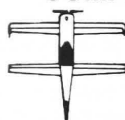
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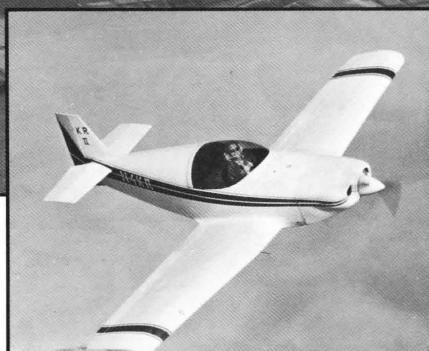
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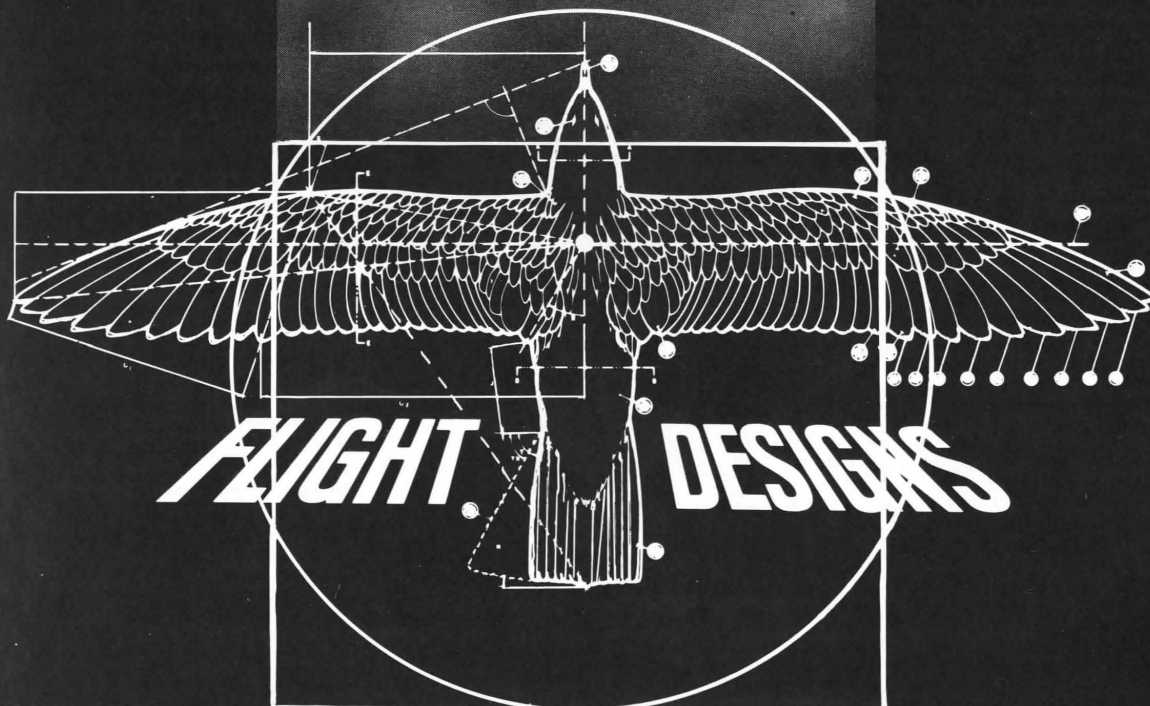
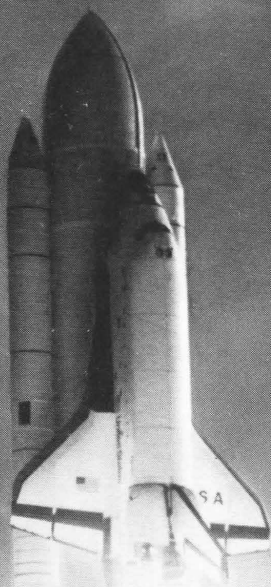
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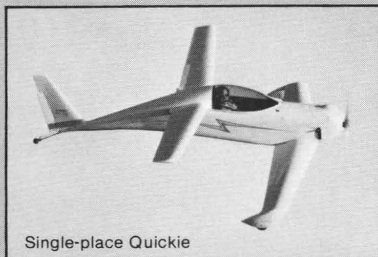
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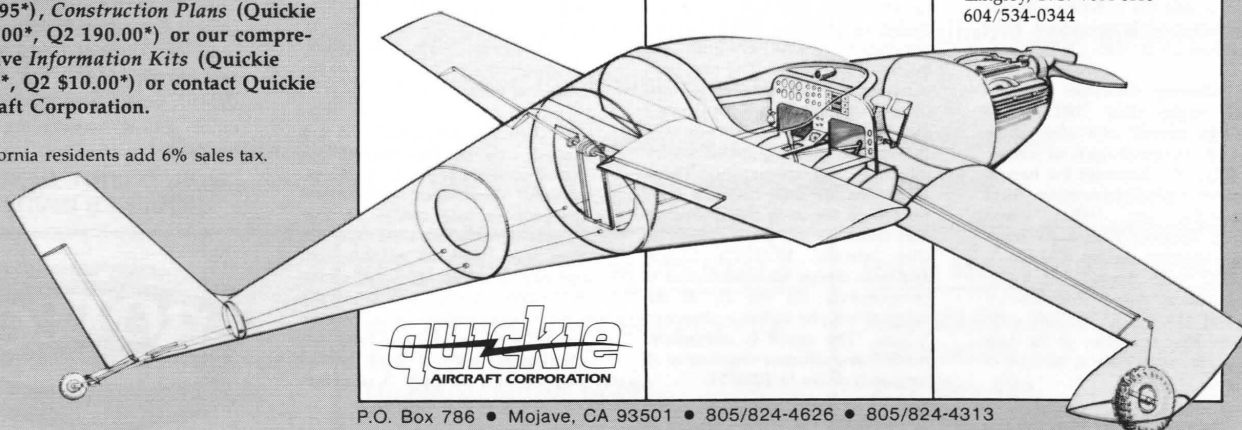
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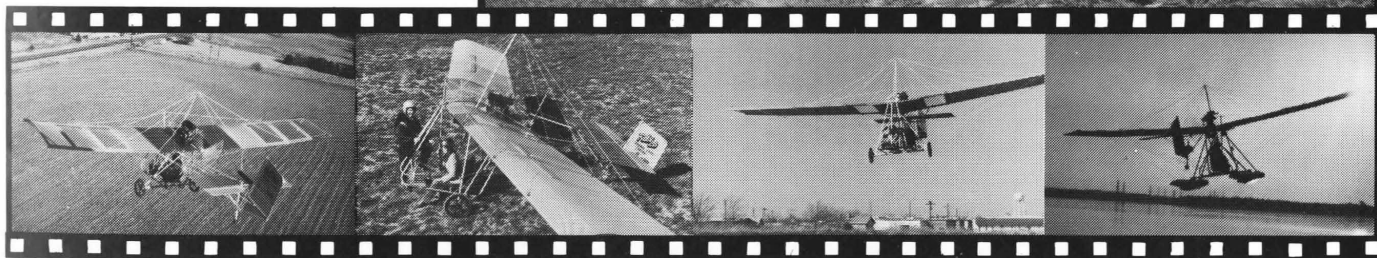
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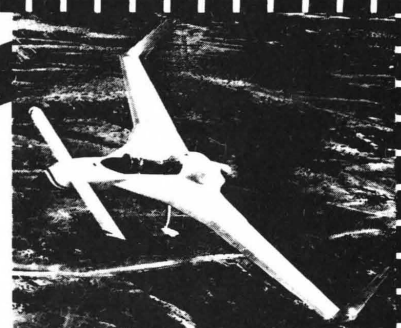
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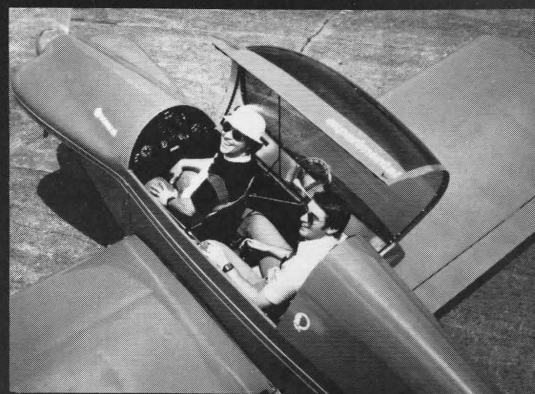


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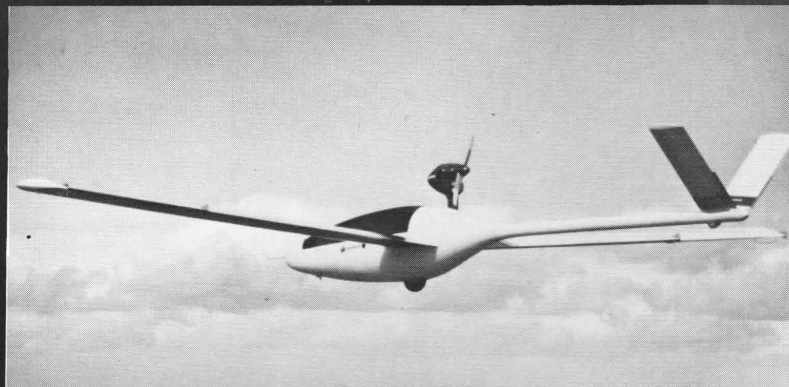
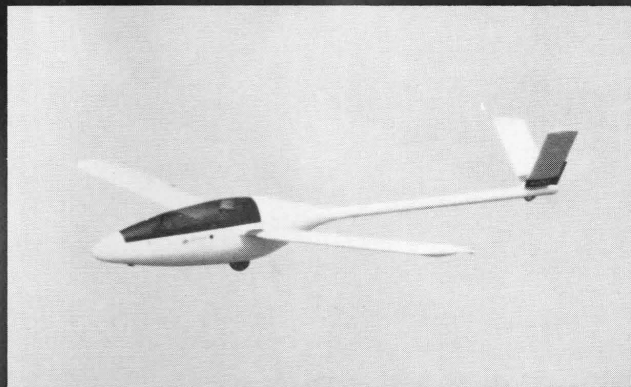
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